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THE AMERICAN JOURNAL OF PUBLIC HYGIENE

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EDITORIALS

THE ECONOMIST AND HIS RELATION TO THE PROBLEM OF CONSERVATION OF HUMAN RESOURCES.

In the December number of the Economic Bulletin we read: "Anyone examining the third quarter of volume II of the Bulletin of the International Labor Office must be struck by the progress in legislation for industrial hygiene. That the labor problem is at bottom a question of health, and that it can best be approached from that side through legislation is a conviction that is becoming world wide." (Page 238.)

This brief statement represents the best thought among many of the leading economists of today. They have studied birth rates and death rates practically from the beginning of economic science but until very recently they did not go back of the birth-rate or death-rate to investigate the influences which controlled these; and when they did go back to examine these conditions they did little to improve them, if they were not satisfactory.

THE PRESENT MOVEMENT.

During the last quarter of a century, however, the economists have made remarkable progress in getting at the real heart of these problems. They have been investigating the physical as well as the social environment of the people in their homes, factories, workshops, offices, and public places. First they made surveys of these conditions and estimated the suffering and loss entailed on account of unsatisfactory environment. Following this they have secured expert testimony as to what steps might be taken to stop this loss—human and economic—and suffering. And having remedies prescribed they are now actively engaged in trying to educate the people to the economic advantages which would accrue from an improvement; and at the same time they are constantly working for laws which will compel the ignorant, the indifferent, and the greedy to improve conditions and thus reduce the loss and suffering.

FIELD OF OPERATION.

The field being covered is a broad one. It ranges from the home to the factory. It covers the question of hours of labor and the effect of this labor upon the human system, but it also considers the effect of foul air and not enough ventilation; of crowded conditions whether in the home, public places, or factories; of too high or too low temperature in these places; of humidity in these places; of light, etc. This is the field now generally spoken of as Industrial Hygiene.

But the question of environment is not now receiving all of the attention of the economist in his effort to preserve the human resources of the country. The question of food is recognized as a vital one. Hence the careful studies which are being made of the status of the underfed. This study extends to the question of underfed school children as well as suffering in cases of unemployment. When action is taken it results in municipal or state bread lines and lunches, as a successor to those supplied by private charity.

But the question of the underfed is only one phase. Pure food is as important as enough food and the pure food laws regulating factories are illustrations of the reforms which most economists now stand for.

Still another field now coming to the attention of the progressive workers is that embodied in the term "Industrial Accidents." Bureaus of statistics, labor and industries are now busily compiling data on this subject. Many good laws have already been secured especially in European countries; in the United States we are making a beginning. Two distinct species of remedial legislation are demanded. The one intended to prevent accidents, the other to provide for the injured in cases where prevention has not been possible. Under the first class comes the demand for guards over dangerous machinery, etc.; under the second comes the various provisions for working men's compensation, accident insurance, etc.

The volume referred to at the beginning of this paper illustrates the movement as well as any recent periodical from any of the branch organizations of economists and co-workers. To illustrate, I quote a few of the titles to laws, resolutions, or orders of state departments which have a direct bearing upon the subject.

German Empire: "Notification respecting the establishment and management of works for the manufacture of alkaline chromates." (Page 352.)

Prussia: Act respecting a further grant of public money towards improving the housing conditions of workmen employed in State undertakings. (Page 356.)

Austria (Vienna): Resolutions of the Town Council respecting the prohibition of the use of paints and colors containing lead and of red lead, in municipal works. (Page 360.)

Denmark: Regulations for shoe factories. (Page 371.) (These regulations cover light, air, sanitation, rest rooms, mess rooms, etc.)

France: Order of the Minister of Public Works, touching safety apparatus to be maintained in mines. (Page 378.)

Circular from the Minister of Labour, addressed to the Divisional Inspectors, on the heating of premises used as work places. (Page 381.)

Act, relating to hygiene and sanitation in mines. (Page 384.)

This list could be developed into a volume which would be a very complete bibliography of the activities in this line of

effort. With economists now entering the field and assisting as they are able by investigation, education, and securing legislation, those who are devoting all of their time to the conservation of human resources may feel that they are gradually gaining able support and public opinion in their favor, and may feel confident that their successes in the past have been but the fore-runners of what is to follow.

JOHN LEE COULTER.

[Asst. Prof. of Economics, Univ. of Minn.]

THE SALOON AND THE HEALTH OFFICER.

The saloon may be accused of contributing to disease by contributing to poverty—by diverting wages from milk and eggs to whiskey, from good clothes and fresh air to rags and fetor; by rendering its patrons more susceptible to disease and more likely to encounter it, less able to withstand exposure to bad weather, and more likely to be exposed; all this and much more is too well known for comment. But there is another aspect which is particularly evident in the small community. In the large city the saloon element is notoriously a large factor in municipal government, but there are other factors also and the saloon devotes itself somewhat strictly to certain lines of endeavor. In large cities Boards of Health are sometimes more free from political influence—hence, more free of saloon influence—than are the other municipal departments. But this statement applies much less to small communities, and it is there that the saloon element is usually most openly prominent in politics. The small town or village almost always is split into two groups—saloon and anti-saloon. The saloon element contains within itself the watchful, loose-tongued, speculative male gossips of the community—the active talkers and thrice-active voters. The anti-saloon element contains the more exclusive, stay-at-home, attend-to-own-business element, the people who don't vote, or if they do, vote usually for the supposedly lesser of the two evils offered in the nominations made by the active, i. e., saloon element.

Thus it is that the medical health officer, representing officially the progressive, humane, altruistic, uplifting department of the city government—the apotheosis of his own profession—finds himself too often in reality the agent of an administration designed, planned and carried out for the sole benefit of the exploiters of the unfortunate. If he is strict in his office he offends these his masters, and at the same time receives no real encouragement from the better element. If he is not strict, he degenerates, and his community, from a hygienic standpoint, degenerates with him. The choice which this office holds out to the practising physician is on the one hand to be a good fellow, soften, evade, hush up, when the saloon crowd might be hit by

his operations, thus enlarging his clientele; or to do his duty, offending possible patients, receiving the cold shoulder from administration associates, finding from day to day obstruction, evasion, delay and deceit, in both official and unofficial information given him in his official capacity and a series of traps set for him in a thousand ways to catch him napping and give him a black eye with the State Board of Health or with the citizens generally. It is the writer's experience that this history with the histories of the choices made by practitioners when they become health officers, would form an outline history, only needing names, dates and specific details, of very many small communities. A rather important corollary, which the vital statistician should heed well, is that in plotting the curves of contagious diseases for a given community for a series of years, he should not attempt to correlate the fluctuations with changes in the water supply, etc., etc., until he has first plotted them against changes in the personnel of the health boards, and the character of the changing administrations of the municipality.

The practitioner is rarely a man shrewd in handling people outside of the sick room, and rarely has any well defined moral position. Being a practitioner he rarely feels called upon to assert himself as a citizen. Pitchfork such an average man into an unknown position, full of technicalities mixed with much very human human-nature and give him his choice between going with or against the current in a matter where he is not expert and he is at once out of his element. Taught by precept and example and compelled by the very nature of his work, to be an individualist, to deal directly with his patient, purely as a therapeutist, to ignore his patient's faults or failures in all directions and think of him as only a sick man needing professional care he becomes used to a certain definite attitude towards others. Remember that the practitioner deals usually with voluntary patients, i. e., those who come to him, respectful, confident, for personal advantage to themselves. In the sick room he is an accepted, chosen, idolized dictator—or he is discharged. But as a health officer he must make people who did not choose him, do things they do not want to do, for the good of others, not for their own. He must look upon their acts not as the acts affect them, but as they affect others. He must appeal to them

upon unfamiliar altruistic grounds and enforce his orders in unfamiliar legal ways. It is not pleasant for him to explain to his personal patients, admiring, confident, dependent on him, why they should be put to trouble and expense at his order, to protect their next door neighbors, perhaps adherents of his competitor in private practice and constructively "knockers" against himself. He would not be human if he did not feel the pressure—even though he do not succumb to it—to lighten the hygienic burdens of his own families and bind them more firmly on those of his competitor. All the more so is this the case if his competitor is on the other side of the eternal saloon question. In a small community every one of the physicians is classified on one side or the other voluntarily or involuntarily. Eyes follow his every move. He is set down as "a good fellow who takes his drink and has his fun like the rest of us," or a crank. There seems to be no middle ground. The saloon, basing its arguments for existence on liberty of conscience and opposition to one man's ideals governing another's, nevertheless insists that while liberty to drink or not to drink is a God-given right, it must be exercised to drink, not to abstain from drinking.

It must be said that the saloon does not wholly make what is popularly known as the saloon element. In every community, male gossips, loose, watchful, speculative, venal, are to be found. It is unfortunate, but it is true, that the saloon attracts, consolidates and leads this element peculiarly; not exclusively, but in such a majority that the sum total result is of direst influence, on municipal government in general and on public health questions in particular.

H. W. HILL.

THE ARRANGEMENT AND PHRASING OF PUBLIC HEALTH REGULATIONS.*

EDITOR'S NOTE.—Amongst the multifarious duties of the professional public hygienist, not the least important is the preparation of rules, regulations, ordinances, etc. This involves some knowledge of what is required from a hygienic standpoint, what can be demanded from a legal standpoint, what can be enforced from a political, psychological and sociological standpoint; and finally the ability to express the essentials clearly, in good English, and with enough formality to give coherence and dignity. The writer of this editorial has illustrated many defects in the specific case of milk ordinances: but the criticisms he makes and the principles he lays down apply to all such matters and are well worth considering carefully.

"Thou shalt not steal." A modern writer of ordinances would be liable to phrase this injunction somewhat as follows:

"Thou shalt not take, remove, carry away, convert to thy own use, or in any way acquire control or possession of any article, substance, compound, or other property belonging to any person, firm, or corporation, without his, her, its or their knowledge, and without giving to him, her, them or it, an equivalent therefor, whether with or without an intent wrongfully to deprive the aforesaid person, firm or corporation of the possession and enjoyment of full rights in his, her, its or their property."

This is no exaggeration of the circumlocution and verbosity of many dairy laws, as the following which I found in the ordinances of a leading city, is proof: "If any person or persons refuse to comply with or wilfully connive at or assist in a violation of any of the provisions of this ordinance, or whoever in any manner interferes, hinders, obstructs, delays, resists, denies, prevents, or in any way interferes or attempts to interfere with the city chemist, assistant city chemist, or milk inspectors, or police officer, in the performance of any duty herein enjoined, or shall refuse to permit such officials or others to perform their duty, by refusing them or either of them, entrance to any premises where milk or cream is stored or kept, or where cows are stabled or kept, or refuses to permit any animal to be viewed or inspected or any milk or cream to be viewed, inspected, tested

* This editorial is part of a paper read before the Iowa Association of Health Officers, Oct. 27, 1909.

or analyzed, or samples to be taken for such purposes, or conceals any milk or cream; or any milk-wagon driver, milk peddler, or milk vendor, who, with his wagon, carriage, or vehicle containing milk or cream, or any person delivering milk or cream by the hand, runs or drives away, or attempts to run or drive away, or conceals or attempts to conceal any milk or cream in his possession, custody, care or control, from any of the officers aforesaid on being approached, or hailed, or addressed, by any such officers in the performance of their duties, shall be deemed guilty of a misdemeanor and fined not less than twenty-five dollars nor more than one hundred dollars for each and every offense."

Had the market milk business been of any importance in the days of the decalogue, the eleventh commandment would have been simply:

"Thou shalt not sell dishonest or impure milk."

That covers the whole case. Adulterated milk is dishonest. Milk that is materially below the average product in composition or that has been skimmed is dishonest, unless the consumer knows what he is buying. Dirty milk is impure and dishonest. Milk with high bacteria count is impure and dishonest.

In writing a milk law or ordinance to-day the following rules should be observed:

First. Avoid unnecessary verbiage. Many words and vain repetitions do not increase the effectiveness of a law. I have already given an illustration of foolish multiplication of words; as this may be regarded as an extreme case, I quote another. The law in a number of places prohibits the sale of milk "which has been watered, iced, adulterated, reduced, or changed in any respect by the addition of water, ice, or other foreign substance, or any adulteration or preservative, whether placed therein for the purpose of artificially increasing the quantity of milk, cream, or buttermilk, or for preserving the condition or sweetness thereof or for any other purpose." This prohibition contains FIFTY-SEVEN WORDS; it could have been as strongly expressed in TEN WORDS by merely prohibiting the sale of milk "to which water or any foreign substance has been added." In law as in rhetoric the concise, simple form of

expression is desirable. The repeated allusion to "person, firm, or corporation," and the awkward repetition of the pronoun "his, her, its or their" in the opening sentence of this paper is not imaginary. They can be found in actual laws. A law is just as strong to use merely the word PERSON with a provision—once for all— that "for the purpose of this act the word person shall mean individual, partnership or corporation"—FIFTEEN WORDS. One State secures the same result by saying that the "word person as used in this act shall be construed to impart the singular and the plural as the case may demand, and shall include corporations, companies, societies, and associations"—THIRTY-ONE WORDS.

Second. Arrange in logical sequence. The mandatory section which is the only absolutely essential portion, should come first, followed by the provisions for helping to secure results. This is contrary to the prevailing practise which often gives the right of the line to a matter of mere detail, to-wit, the issuing of licenses or permits—having dealers licensed is a great convenience in enforcing a milk law but is entirely non-essential. A law will "hold" in court if poorly arranged, as it will if too wordy, but it is not necessary to violate every rule of English composition when drafting a milk law.

Third. Omit self-evident matters. It is nonsense to enact as has been done in more than one case, that an inspector shall be a COMPETENT PERSON, that a chemist shall make CORRECT ANALYSES, that an inspector shall HAVE A RECORD BOOK and keep CAREFUL RECORDS, or that a chemist shall have NECESSARY APPARATUS. I have found one law which directs the testing of milk "with such instruments as are used for such purpose." Some places think it necessary to define the words MILK and CREAM.

Fourth. It is unnecessary to enact matters which ordinary rules of evidence will take care of. I have found this: "The person securing said sample may securely pack and box said sample and send the same to the State Chemist, or other competent person appointed hereunder for the purpose of making examinations or analyses of samples, and his testimony that he did procure the samples and that he sealed and numbered the same as herein provided and that he wrote his name thereon

and that he packed and boxed said sample and sent the same to the State Chemist or other competent person appointed hereunder to analyze such sample and the testimony of the person to whom said sample is addressed that he received said box or package in apparent good order; that said sample was sealed and that the number and name of the sender, as herein provided for, was on said sample, and that the seal at the time the same was received was unbroken, shall be prima facie evidence that the sample so received is the sample that was sent and that the contents thereof are the same and in the same condition as at the time the person so procuring said sample parted with the possession thereof, and the testimony of said two witnesses as above shall be sufficient to make such prima facie proof." This same principle holds true in the question of agency; it is idle to enact that the act of an agent within the scope of the duties of his position shall be deemed to be the act of the principal. It is foolish to put into formal laws as does one city that an inspector in taking a sample shall "cause the milk or cream to be thoroughly mixed by stirring or pouring."

Fifth. Refrain from violating fundamental, constitutional principles. For instance: Every defendant is entitled to confront and cross-question witnesses who appear against him, and the frequent provision of milk laws that the affidavit of a chemist "shall be accepted as evidence" is worthless if contested. One law says: "The results of (the chemists' analysis) shall be taken as correct."

Sixth. Avoid generalities and things that cannot be enforced. Do not require "properly constructed stables" or forbid the keeping of cows "in a crowded condition." It would be difficult to maintain successfully a court case based on such vague language. One law that I have seen requires that milk shall be sold as "soon as possible" after it is drawn from the cows; another, that "cows shall be allowed to be in pasture four hours per day, weather permitting." One city says that "animals shall be allowed plenty of out-door exercise" and in another law I read that "cows shall be fed liberally." Such sentences, as laws, are not worth the paper they are printed on, though as educational suggestions they would have a value.

Seventh. Do not put upon the government the burden of unnecessary proof. If you forbid adulterating milk "with poisonous substances" as is the law in many cases, you must prove adulteration and also that the adulterant you find in the milk is actually poisonous. One law prohibits the "use of any substance added for the purpose of MODIFYING THE PHYSICAL PROPERTIES of said milk or cream." In one place the law prohibits the feeding to cows of food "which will produce milk which is unhealthy or unwholesome." Such laws unnecessarily increase the proof needed to succeed in court and therefore increase the work of prosecuting cases. This always helps the law-violator. On this principle, the word "knowingly" is now generally omitted from food adulteration laws.

Eighth. Use care in phrasing sentences. Do not throw common sense and grammar to the winds when you attempt to draft a milk ordinance. I have already alluded to the importance of using reasonably good English in the construction of milk law. But I repeat the suggestion with emphasis, and add that there should be no gross errors in the sentence-making. Such advice would be superfluous were it not for some strange specimens that may be found in the milk laws of some cities. A prominent city has this mandate: "Every person offering milk for sale from a cart or other vehicle shall be painted on both sides thereof," etc. Another city has a regulation about milk "drawn from any cow having a temperature or which has been kept at a temperature higher than 50 degrees F." In another place there is a requirement that "the bodies of all milk cows including their tails, shall by such person, firm or corporation be kept in a cleanly condition by means of brushing and washing." The word "otherwise" is sometimes overworked, as in the law requiring that an inspector taking a sample of milk shall "seal with proper seals or otherwise." Another frequent fault in milk laws is in the clause which fixes a standard of total solids, for instance, of 12 per cent., and adds "of which 3 per cent. shall be fat." Three per cent. of 12 is 36 hundredths of 1 per cent. which is the legal amount of fat in milk when the law is worded as above, although 3 per cent. of fat was intended. One city has a law requiring proper facilities for "washing OR sterilizing" dairy utensils.

So much for the LETTER of the law, which is important. But the SPIRIT of the law is of even more concern. In the agitation for a law before its enactment, and in its enforcement after enactment the spirit of the law is of the utmost importance and must always be clearly in mind. The purpose of the law is to prevent the sale of dishonest or impure milk, and dairy laws are needed for three reasons:

First. A minority of producers and dealers are dishonest.

Second. A minority of the same are negligent.

Third. Some producers and dealers are ignorant.

The great mass, who are in neither of the above classes are the intelligent, careful and well disposed dairymen. In enforcing milk laws we should cause these producers as little trouble as possible. Necessarily they will be put to some inconvenience; they must secure licenses, or permits, and must pay therefor; their wagons must be stopped on the street and samples taken; their dairy equipment and methods must be regularly inspected. The rain falls on the just and the unjust. Though in some respects the law-abiding dairymen must be treated the same as the worst scamps, officials should perform their duty so tactfully as to give no offense and if possible to win friends for the law and its enforcement. Further than this, if the inspector is fully competent and judicious he may as an incident of his work, be of great assistance to these dairymen as some offset for the trouble caused. Even if their conditions are so good that they are safely within the law, their establishments may be far from perfect and may be susceptible of much improvement. If the inspector gains the confidence of these farmers and makes an occasional suggestion with good judgment there will be a steady improvement in the dairy conditions of even those who are in the better class, and who are clearly law-abiding citizens. The law will have another benefit to the intelligent, honest dairyman. It will help his business by saving him from the competition of the ignorant, negligent and dishonest, by keeping dishonest and under-grade milk from the market and by raising the dignity of the milk business.

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American Public Health Association

REPORT OF AN EPIDEMIC OF PROBABLE PARA-TYPHOID FEVER.*

By ALLEN W. FREEMAN, M. D.,
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HARRY T. MARSHALL, M. D.,
Professor of Bacteriology, University of Virginia.

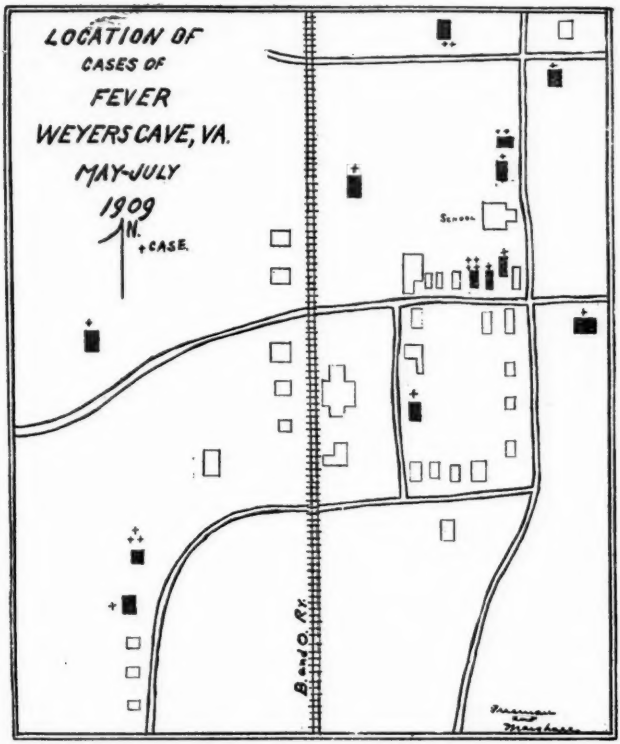
The following epidemic is reported, notwithstanding the fact that the diagnosis could not be definitely established by the isolation of the specific organism, for the reason that it presents features markedly different from those of the typhoid fever to which we are accustomed in Virginia, and that the results of agglutination tests make it highly probable that it was an epidemic of true paratyphoid fever.

In the latter part of June of the present year (1909) an unusual prevalence of a disease supposed to be typhoid fever was reported to the State Department of Health of Virginia from the town of Weyers Cave, Virginia. Weyers Cave is a town of about three hundred people, situated in Augusta County at the upper end of the Shenandoah Valley. The town is built on both sides of the Valley Branch of the B. & O. Railroad, on a series of rolling hills. Geologically the town lies just across an important fault, half the town being built on a limestone formation and half on shale. Prior to the present outbreak, the town had been free from any continued fevers for at least three years, and there had been no marked outbreak of typhoid fever during the period within the memory of any of the inhabitants. The surrounding country has been, however, for many years heavily infected with a disease known locally as Valley Fever, supposed to be a mild form of typhoid.

Beginning on May 26th, cases of the disease in question began to appear, but the situation was not regarded as serious until late in June. In all, 27 cases were reported to the Depart-

* Read before the American Public Health Association at Richmond, Oct., 1909.

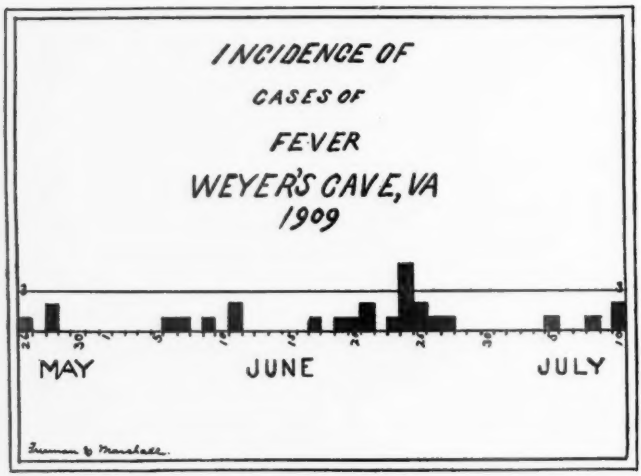
ment. A preliminary investigation, made by one of the writers representing the Virginia State Department of Health, disclosed the fact that the disease presented clinical features markedly different from those of the typhoid fever to which we are accustomed. At the time of our first visit most of the cases had already recovered; the cases were exceedingly mild, being usually



afebrile by the ninth day, and the patients made a rapid convalescence. None of the patients were seriously ill, none exhibited symptoms of perforation or hemorrhage, and no case presented a typical typhoid picture. In view of this fact, and of the fact that the preliminary epidemiological investigation was totally negative as to the cause of the epidemic, preparations

were made at once for a thorough study of the disease. A temporary laboratory was established in the village, the writers and two assistants conducting the investigation. This laboratory remained on the field about two weeks, and subsequently further bacteriological work was done in a temporary laboratory located in the City of Staunton, twelve miles distant, where facilities for laboratory work were more convenient and adequate.

The following brief summary of the epidemological features of the outbreak may be of interest as showing the negative character of the evidence obtained. The location of the cases is



shown on the accompanying chart, the numbers referring to the order in which the cases occurred. In addition to the cases shown on the chart there were several cases in the surrounding country, at a distance of from one-half to one and one-half miles from the village. A study of the chronological chart leads to the impression that some general cause was operative in spreading the disease. The concentration of cases at intervals of seven to ten days is very suggestive of such a cause, and the period between the first cases and subsequent ones, suggests the fact that the first cases were the source of the infection.

WATER. Most careful investigation was made of the water supply of the cases. There is no general water supply for the town, the inhabitants depending upon individual cisterns, wells, and springs. Fourteen of the cases used well water exclusively, being in nine different houses supplied by nine different wells; six of the cases used cistern water exclusivley, being in six different houses with six different cisterns; one of the cases used spring water exclusively; six of the cases used a combination of waters. There was absolutely nothing in common in the water supply of the cases. The wells on one side of the village are driven in shale and on the other side in limestone. The cisterns had for the most part been filled from rains in April and there was no rain from that time to the end of the epidemic.

DAIRY PRODUCTS. Each of the infected houses had its individual cow, kept on the place and milked by some member of the family. So far as could be learned on most careful examination, no milk or butter is sold in the town, the inhabitants depending entirely upon their own cows for dairy products.

Only two of the cases were supplied with ice prior to the onset of illness, and this was artificial ice made from distilled water, and sent from a city twelve miles distant.

Owing to the season of the year no shellfish were in use nor had any been sold in the town for two months prior to the outbreak.

FRESH VEGETABLES AND FRUIT. In the early part of the outbreak no fresh vegetables were in use, as none were shipped in from outside and the gardens were not producing. In the later part of the outbreak some vegetables were being used, all from the gardens of those using them, and there was no general distribution. Human manure is not used for fertilizing. Suspicion was at one time in the course of the investigation directed to the fact that the onset of the disease was coincident with the ripening of strawberries in the fields about the town, and careful investigation of this point was made. Fifteen of the cases had eaten no strawberries whatever, five of the thirteen remaining could not remember having eaten them, but were not sure, seven cases had eaten strawberries coming from three different sources. This was early in the outbreak and no connection could be

traced between the strawberry pickers and the disease. In addition only a small proportion of the strawberries produced in the neighborhood were consumed there, the balance being shipped to the neighboring town of Harrisonburg where they were retailed and consumed. No cases of typhoid appeared in Harrisonburg during this time.

The only confectionery is located at the drug store kept by one of the physicians. Ice cream made in Harrisonburg, and shipped into the town was sold there, soda water being also dispensed. Only two of the cases were sure of having eaten ice cream or drunk soda water, four were doubtful, and twenty-one were positive that they had not consumed either.

CONTACTS. Multiple cases in single houses were common, but only two cases had been in positive contact with previous cases of the disease during the period of incubation. Ten cases had been remotely exposed to previous cases of the disease, such as visiting infected houses though not eating anything or drinking water, and in some cases not even going inside the gate.

The town is peculiar for Virginia in that it is almost free from colored population. Only three or four negroes live in the town itself and very few in the neighborhood. Only one negro is employed in domestic service in the town and there were no cases of the disease in the house in which she worked.

AGE DISTRIBUTION. The age distribution of the cases was remarkable. Thirteen, or 48% of the cases were under ten years; eight, or 30%, were between ten and twenty; while only six, or 22% were over twenty years. The proportion of cases under twenty, 78% is very suggestive.

Although the churches of the town are not supplied with wells, the church attendance of individual cases was recorded. The cases were uniformly scattered through the various denominations and churches of the neighborhood.

There had been no public gatherings of any kind, except one early in May—a lantern slide talk at which nothing was eaten or drunk, and at which about 60% of the cases were in attendance.

School closed three weeks prior to the beginning of the outbreak.

CONCLUSIONS. A careful study of the results summarized above leads to no definite conclusion as to the means of spread of the disease. It is unreasonable to suppose that all the springs, wells and cisterns could have been infected at approximately the same time. Water as means of dissemination in this case can, we think, be excluded. Evidence as to milk, shellfish, fresh vegetables, fruits, and other foods as carriers of the infection is negative. Flies as carriers of the infection have been constantly in mind, and the following factors must be considered. The first cases occurred at a time when flies were just becoming prevalent, and as far as is known when infectious material was not present in large amount in the town.

The town, of course, abounds in dry closets, most of which were in bad order, and were evidently neglected. As soon as the disease began to appear, however, the attention of the people was directed to this factor and steps were taken to remedy the condition. Rigid disinfection was insisted upon by the physicians in charge from the very first, and so far as could be learned by the writers, was well carried out. There was apparently, at no time in the village any considerable amount of infected excreta exposed to flies. The precautions regarding dry closets were kept up after the cases began to convalesce and were continued throughout the course of the epidemic. The evidence as to flies is in our opinion far from conclusive.

BACTERIOLOGICAL REPORT. A few agglutination tests were made with the serum of patients and a culture of B. typhosus. The bacteria did not agglutinate typically. In dilutions up to 1 : 50 a few small, loose clumps formed within two hours, but the main mass of bacteria remained free and motile.*

A comparative test was next set, using one serum against several different bacteria at the same time.† The hanging drop method was employed using a fresh, 18–24 hour living agar culture, suspended in normal salt solution. The result of this test is shown in table I:

* In a few specimens, which were allowed to stand over night, large, tight clumps, and motile Pfaundler's threads developed.

† We are indebted to the Director of the U. S. Hgyienic Laboratory for furnishing us cultures for this work.

TABLE I.

Case No.	Dilution of Serum	Suspension of Paratyphoid A	Of Paratyphoid B	Of Typhoid	Of Para Colon
4	1 : 10	0	*xxxx*	0	0
	1 : 50	0	*xxxx*	0	0
	1 : 100	0	*xxxx*	slight trace	0
	control	0	0	0	0

The reading gives the end reaction after two hours. In this experiment agglutination of paratyphoid B began promptly, and at the end of two hours was positive in a dilution of 1 : 100.

A series of serums were next tested simultaneously against typhoid and paratyphoid B. The first seven serums were tested by the hanging drop method, the remainder by the macroscopic method, using a dilution of 1 : 30, and noting the rapidity and completeness of the agglutination reaction.

TABLE II.

Name of Patient	Dilution of Serum	Agglutination with B. typhosus	Agglutination with B. paratyphosus B.
Case No. 6	1 : 10	0	*xxx* 40 min.
	1 : 50	0	*xx* 40 min.
	1 : 100	0	*x* 1 hour
Case No. 7	1 : 10	0	*x x* 1 hour
	1 : 50	0	*x* 1 hour
	1 : 100	0	trace 1 hour
Case No. 11	1 : 10	0	*x* 1 hour
	1 : 50	0	*xx* 1 hour
	1 : 100	0	*x* 1 hour
Case No. 16	1 : 10	0	*x* 1 hour
	1 : 50	0	*xx* 1 hour
	1 : 100	0	*xx* 1 hour
Case No. 12	1 : 50	Trace	*x* 1 hour
	1 : 100	Suggestive	*x* 1 hour
Case No. 20	1 : 50	Slight	*xx* 1 hour
	1 : 100	Trace	*x* 1 hour
Case No. 26 Serum taken during first few days of disease	1 : 50	Slightly suggestive	Suggestive
	1 : 100	Slightly suggestive	Suggestive
Case No. 1	1 : 30	0 ?	*xxxx* 1½ hour
Case No. 3	1 : 30	0 ?	*xxx* "
Case No. 9	1 : 30	0	*xxx* "
Case No. 13	1 : 30	trace	*xxx* "
Case No. 15	1 : 30	trace	*xxx* "
Case No.	1 : 30	0	*xx* "
Case No. 25	1 : 30	0	slight
Case No. 22	1 : 30	0	*xx* "
Case No. 27	1 : 30	0	*xxxx* "

From Tables I and II it is seen that of 17 cases tested, all except two, Nos. 25 and 26, reacted positively with paratyphoid B. The serum from No. 26 was obtained at an early stage of the disease. Out of eight cases tested quantitatively, six were definitely positive with paratyphoid in a dilution of 1:100. In several cases, marked "trace," "suggestive," "?" or 'slight," the patients serum produced small clumps in the typhoid culture, but left many free and active organisms. It is best to regard those results where the reaction is doubtful as negative. Case No. 26 may be discarded. This leaves 16 cases of which 15 reacted positively with the paratyphoid B bacillus, while none of them gave a clear, positive reaction with the typhoid bacillus.

As these cases came from different parts of the village of Weyers Cave, were of different ages, and occupation, and were attacked at different times, it seems reasonable to infer that the entire series of cases was caused by the same strain of bacterium.

In attempting to obtain a clue to indicate the presence of some carrier in this epidemic agglutination tests were made with the blood of 38 individual, mostly healthy members of households in which cases of fever had developed. Of these 38, five, (four adults and one adolescent), gave positive reactions with the paratyphoid B; the other thirty-three reactions were negative.

A month after the agglutination tests were made at Weyers Cave, but while cases were still continuing to appear at that point, a mild fever, resembling the disease at Weyers Cave, broke out in a household about six miles away, attacking five out of six of the family. Through the kindness of Dr. Whitemore the serum from these patients was examined and from another patient, living about ten miles from Weyers Cave, suffering with a severe, typical case of typhoid fever. The latter patient and two of the members of the above mentioned family reacted with the typhoid bacillus positively, and gave no agglutination with the paratyphoid B. The other members of the first mentioned household, in whom the disease was of recent development, gave no agglutination with either culture. This indicates that in the vicinity of Weyers Cave true typhoid were also occurring during last summer.

Several attempts were made to recover the paratyphoid B. bacillus from the stools of patients, chiefly by the use of Endo's medium, but without result.

Blood cultures were made from three patients. The first patient had had the fever for over a week, the others for only a few days. About ten c. c. m. of blood was divided among several agar and Endo-agar plates, and a part was put in broth and dextrose broth. The blood from the last case was mixed with sterile ox-bile, incubated, and attempts were made to cultivate the bacillus from the mixture. All of the blood cultures remained sterile.

After the failure to recover the offending organism by workers in the laboratory located in the town of Weyers Cave, efforts were made to isolate it by Mr. J. A. Waddill, Acting Bacteriologist of the Virginia State Department of Health, working in the branch laboratory in Staunton. Notwithstanding the fact that five or six cases, apparently favorable as to time, were carefully examined, using Endo's media, no organism resembling typhoid or paratyphoid could be isolated. It is important that at this time studies were also being made of the typhoid fever situation in Staunton, twelve miles from Weyers Cave. The typhoid bacillus was discovered without difficulty from the Staunton cases, using the same technique and same media as that used in the cases at Weyers Cave.

CONCLUSIONS.

The writers believe that there prevailed at Weyers Cave, Virginia, during the summer of 1909, an epidemic of a disease which was probably paratyphoid fever. We believe further that the epidemological studies failed to give any reasonable explanation as to the means of transmission of the disease.

We believe that this condiiton was peculiar to the epidemic in question as further studies in the same neighborhood disclosed the prevalence of a disease which was clinically and bacteriologically true typhoid fever.

The thanks of the writers are due to Drs. Sellers and Hoskins, of Weyers Cave, who had charge of the cases and who have reported the clinical aspects in a paper read before the meeting of the Medical Society of Virginia, and also to Mr. J. A. Waddill, whose work is reported above.

THE CONTROL OF TYPHOID FEVER IN THE CITY AND COUNTRY WITH A DESCRIPTION OF A MODIFIED HESSE'S MEDIUM FOR THE DETECTION OF THE TYPHOID BACILLUS IN EXCRETA AND FLUID FOODS.*

By WILLIAM ROYAL STOKES, M. D., and FRANK W. HACHTEL, M. D., Baltimore, Md.

ABSTRACT.

Before describing the various methods for the control of the spread of typhoid fever and the assistance rendered to these methods by means of a modified Hesse's medium, we shall first describe the manufacture of this medium and its uses and limitations in the detection of the typhoid bacillus. Jackson has described the various media used for the detection of the typhoid bacillus, but as Hesse's semi-fluid medium is the best method we shall simply describe this medium, adding our own modifications.

The formula of the medium is as follows:

Agar (absolutely dry),	4.5 grammes (dried at 105° C. for half an hour.)
Liebig's ext. beef,	5 grammes.
Peptone (Witte),	10 grammes.
Salt,	8.5 grammes.
Distilled water,	1000 cc.

Before using, the agar should be dried at 105 degrees C. for half an hour to free it from all moisture. This medium should be kept in an ice chest, the air of which is saturated with moisture.

The agar is dissolved in 500 cc. of water by heating and the loss by evaporation made up. The peptone, beef extract and salt are dissolved in another vessel containing 500 cc. of distilled water, and the loss of weight by evaporation is made up by the addition of distilled water. The two solutions are then mixed and boiled for thirty minutes, the loss of weight being made up

* From the Bacteriological Laboratory of the State and City Board of Health, Baltimore, Md. Read at the meeting of the American Public Health Association at Richmond, October, 1909.

by the further addition of distilled water. It is next filtered, the reaction corrected to the neutral point and tubed, nine cubic centimeters being placed in each test tube. It is then autoclaved at 15 lbs. pressure for twenty minutes and stored in the ice box.

METHOD OF DILUTION EMPLOYED.

1 gramme feces.
1 cc. urine or of a bile culture of urine, feces, milk or water is added to 9 cc. of sterile water.

From tube No. 1, 1 cc. is poured in a plate, a second cc. is inoculated into tube or water-blank No. 2. From Tube No. 2, 1 cc. is poured into plate No. 2, and 1 cc. is placed in test tube No. 3, and this is continued through eight water-blanks and plates.

Upon plates in which the colonies are few in number, the typhoid bacillus presents a characteristic appearance. On such plates the colonies are much larger than those of the B. coli, having an opaque nucleus surrounded by a translucent area, beyond which is a circular white edge which presents a concentric arrangement. The colon bacillus, on the other hand, occurs as a white colony seldom larger than the head of a pin.

Hesse has isolated the typhoid bacillus from stools and urine, while Jackson has obtained it from artificially infected milk, from the Hudson River and small water supplies. These concentric colonies, however, sometimes turn out to be B. paratyphosus, B. fluorescens, B. fluorescens liquefaciens, and other motile water organisms. In using this medium for stools, urine, bile cultures, and water, we often met with the same difficulty, the Bacillus alcaligenes often exactly resembling the typhoid colonies. One of us had noted that the typhoid bacillus will readily acidulate ordinary nutrient agar to which one per cent lactose and five per cent of glycerin had been added. Upon adding these constituents to Hesse's semi-fluid medium, we found the colonies of the typhoid bacillus and the para-typhoid bacillus will produce typical pink colonies if azolitmin is added to the medium. We also found that we must add 6 grammes of agar as the glycerin makes the medium more fluid.

In plating out stools and urine the above mentioned organisms are pink, whilst the colonies of Bacillus alcaligenes form a

typical blue concentric growth. Other motile organisms such as Bacillus proteus, Bacillus fluorescens, Bacillus fluorescens liquefaciens and the Bacillus pyocyaneus are almost always alkaline, and the colonies are therefore blue. The paratyphoid bacillus forms a red colony with a concentric zone which can only be distinguished from the typhoid bacillus by picking a colony and mixing it in a little bouillon and testing it for agglutination with the typhoid immune serum furnished by Parke, Davis & Co., which will agglutinate the typhoid bacillus at a dilution of 1 to 100,000. These colonies are then subjected to the ordinary cultural tests for the typhoid bacillus or for the paratyphoid bacillus, if they agglutinate with immune serum made from these organisms.

THE ISOLATION OF TYPHOID BACILLUS FROM DRINKING WATER.

We have been successful so far in isolating organisms typical of the typhoid bacillus from one of the impounding reservoirs in our water supply and from one of the streams emptying into an impounding reservoir. Two hundred cubic centimeters of water were centrifugalized and the sediment was inoculated into lactose bile in a fermentation tube. At the end of twenty-four hours a series of dilutions was made in this modified Hesse's medium and incubated at 37 degrees C. for twenty-four hours. At the end of this time a number of typical large concentric pink colonies appeared in the litmus glycerin lactose semi-fluid agar, and pure cultures were made on slant agar tubes. Several of these organisms corresponded culturally to the typhoid bacillus, and one from each source was virulent for animals, causing purulent peritonitis and general bacteremia with death in twenty-four hours. Upon making agglutination tests with known typhoid blood these organisms would at times give typical agglutinations but at other times they would not agglutinate with such blood. It should also be noted that none of these organisms isolated from water will agglutinate at a dilution of 1 to 1000 with a strong Parke, Davis immune serum, which will agglutinate a typhoid bacillus obtained from the blood of typhoid fever in a dilution of 1 to 100,000. We also obtained a typhoid bacillus from a stream laden with sewage which passes through Baltimore. This organism agglutinated with immune

serum in fairly high dilutions and gave the other tests mentioned above. We also obtained the typhoid bacillus from a well which supplied a large boarding school with water in one of the counties of Maryland. A large number of cases of typhoid fever developed among the boarders, but the day scholars entirely escaped. Upon investigation it was found that the day scholars drank water from a different source and only the boarders used water from this well. The typhoid bacillus produced the characteristic colonies on our modified Hesse's medium, agglutinated with typhoid blood and immune serum, was pathogenic for animals and produced all of the cultural reactions of the typhoid bacillus. Immune serum made in the rabbit by injections of this organism was also agglutinative for typhoid bacilli obtained from cases of typhoid fever.

CARRIER CASES.

We have used our modified medium in order to detect carrier cases and recite the following example as a successful test: A colored boy began waiting on the table at the country place of his employer and two weeks later the wife of his employer developed typhoid fever. At the same time he began waiting on the table at his own house and three weeks after this his sister was attacked with typhoid fever. He had never handled raw food previously nor waited on the table. An examination of his stools and urine showed the presence of many typical red colonies which later proved to be typhoid bacilli agglutinating with high dilutions of the typhoid immune serum.

INSTITUTIONAL TYPHOID.

We have studied two outbreaks of typhoid fever and have been able to locate the carrier cases by means of the modified medium and thus stop the epidemic.

The first outbreak occurred in a home for young women containing fifty inmates and three servants and in about eight months about fourteen cases of typhoid fever had developed among the inmates. All other causes of typhoid fever were excluded as the water was boiled, the milk pasteurized and the vegetables carefully washed in boiled water. Cultures from the stools and urine were taken from every inmate of the house including the domestics and in the specimen made from the

stool of the cook, who had entered the institution about two months previously, the typhoid bacillus was found in large numbers on several different occasions. This woman handled the bread and all raw foods except milk, and upon being removed from the institution the epidemic ceased.

The second outbreak occurred in a Convent and Home for Colored Children, containing eighty-eight inmates in all. All other causes of typhoid fever were excluded and upon making an investigation we found that the eight cases which had developed could be divided into two groups of four each. Two of the sisters handled the milk and other raw foods which were used by the other sisters in the institution. The typhoid bacilli were detected in the stools of both of these sisters and four other sisters had developed typhoid fever, having received infected food from these persons.

The second group consisted of cases of paratyphoid infection confirmed by the agglutinative reaction for the paratyphoid bacillus and its isolation from the stools. These cases were all among the colored children, and upon investigation the paratyphoid bacillus was isolated from the urine of one these sisters who handled their food and from the stools and urine of another sister who was thrown more or less in contact with these children in a separate part of the building.

In conclusion we believe that this modified medium by means of the color reaction which it shows for the typhoid and the paratyphoid bacillus will prove useful in detecting this organism in water, milk, stools, urine and other similar materials.

THE MANAGEMENT OF MILK BORNE OUTBREAKS OF TYPHOID FEVER.*

By Dr. CHARLES V. CHAPIN,
Health Officer, Providence, R. I.

Last autumn an outbreak of typhoid fever in Providence, confined to the customers of a certain dairy, led to the careful consideration of several points of interest in such outbreaks, and induced me to write to a number of men interested in epidemiological matters, asking for an expression of their opinion. Answers were received from nearly all, and this paper is a consideration of the subjects discussed.

In the first place it seems to me that the only evidence on which it can be reasonably assumed that a given milk supply is the cause of typhoid fever, is an excess of cases among the persons supplied, provided, of course, that no other possible connection between the cases can be found. From this opinion, however, several of my correspondents vehemently dissented, but I cannot help thinking that there must be a certain percentage of cases on a milk supply which, if exceeded, renders it fairly certain that the supply is infected. This percentage depends primarily upon the total amount of typhoid fever in the community. If there is an excess of typhoid fever upon a milk supply over and above the limits determined by the law of error, then we may reasonably assume that the milk is the source of the disease. The percentage of cases must be larger in a city where there is much typhoid fever than in one where there is little, and according to the law of error it must be larger for a small supply than for a large one, and larger if the supply is confined to a limited area than if it includes a large part of the city. In a very small supply, as where one or two customers only, receive the milk, the number of cases infected would be of no value, but for ordinary milk routes, in ordinary cities, it would certainly be possible to work out mathematically the percentage of cases which if exceeded would indicate with a fair

* Read at the Richmond meeting of the American Public Health Association, October, 1909.

degree of certainty that the milk is at fault. I am not competent to work out this problem, and evidently my correspondents have not done so, for those who think as I do, that the percentage of cases is an all important point, give as the danger limit all the way from 0.1 to 5 per cent.

There is another way of approaching this problem and that is by the study of the cases which actually do occur on milk routes and noting how large a number develop on a single route in a given time, say a week, without the development of an outbreak. An examination of the milk cards in Providence shows that out of about 600 dealers, 155 have had one or more cases of typhoid fever among their customers during the last four years. Only nine of these have had more than two cases on their route within a week. Investigation promptly showed in three instances that the cases were due to personal contact between the families. In the other six instances an unmistakable milk-borne outbreak developed. It is desirable that the milk cards in other cities be examined in the same way.

It was assumed in my first query that when it appears that an outbreak is due to infected milk, the incriminated supply should be at once stopped by the local health officials. But Pease called attention to what seems to be the fact, that in a large majority of reported outbreaks, the infection of the milk ceases before the order of the board of health goes forth. The outbreak declines and the board of health gets the credit, but the milk becomes free from infection before the order is issued, and perhaps before the investigation is made. As the average incubation period of typhoid fever is probably two weeks, it is fair to conclude that some unknown cause checks the outbreak if its crest is earlier than two weeks after the stopping of the supply. I have recently studied some sixteen outbreaks, and in all but two the distribution of the cases in point of time suggests that the infection was not continuous, but affected only a single distribution of the milk. Usually the outbreak extends over about a month, though by far the larger number of cases are more closely bunched, giving the curve of distribution quite a sharp apex. The early and late straggling cases suggest unusually short, and unusually long periods of incubation. I shall be very glad to have my attention called to outbreaks

in which it is definitely determined that there is only a single infection of the milk, so that the curves of such outbreaks may serve as a standard for comparison. When the outbreak is due to contaminated water getting into the milk, it is not unlikely that often the milk may be continuously infected for some time. Such perhaps was the case in Springfield, in the outbreak studied by Sedgwick in 1892. But usually milk is infected directly by handling by persons who have the disease or are carrying the bacilli. Such infection is dependent on chance which is much against the infection, so that theoretically we should not expect a sick person or carrier to infect the milk continuously, and as a matter of fact carriers as shown by Davies, Greig and others, do cause infection only in a very irregular and intermittent manner.

It is a very difficult problem which often confronts health officers when the evidence begins to point strongly to a given milk supply as the source of a typhoid fever outbreak. We may admit for the moment that in a few days the evidence will probably become conclusive, and that in most instances careful search will discover the real source of the trouble, but there is often if not usually, a few days during which the search is being made, and in which it appears to the health officer that the milk is probably infected, though he cannot for the time being put his finger on the point of infection. Frequently the public are aware of the facts, and owing partly to the undue emphasis which has of late been laid upon milk infection, are greatly alarmed, and owing to the usual complacent claims made by health officers as to their efficiency in stamping out such outbreaks, the press is likely to hold the sanitary authority strictly accountable for all cases subsequently occurring, unless active measures are taken. What must the health officer do. He may:

First. Do nothing at all until the real source of the trouble is discovered. This is the course recommended by a number of men whose opinion is of much value. It scarcely seems wise, if anything is to be done at all, to delay doing it at once as soon as it becomes fairly certain that the outbreak is due to the milk. Certainly such delay is fraught with danger to the health officer, and is scarcely justifiable on scientific grounds, for it will be

admitted that many outbreaks are traced to milk with a high degree of certainty, several days before the source of the milk infection is discovered, also that in some outbreaks the real source is never discovered, and I suspect that in some others the findings of the health officer are based on pretty weak evidence.

Some of the correspondents insist that in such cases the actual source of the infection must be discovered before any action is taken. Others think the supply should not be stopped when the source of infection is unknown, unless the evidence is very strong indeed, that is the number of cases much larger than our mathematical formula demands. One writer would stop the supply until the dealer finds and removes the source of infection, thus putting the burden of proof on him. Most gave rather evasive and indefinite answers as to what should be done under such circumstances. If the supply is stopped it is necessary to see that it does not go elsewhere, usually not a difficult matter owing to the publicity given by the press. If the milk is pasteurized it may be used for butter making; otherwise not, for though there is little evidence of butter borne typhoid fever, there is a possibility of it, and this restriction is not a burdensome one.

SECOND. The dealer may be compelled or permitted to pasteurize his supply, or perhaps the city might do it for him. Kober, Trask and Hill advise this course. There are, however, practical difficulties. No city as yet has a pasteurizing plant as recommended by Trask, and it would be difficult for a dealer to arrange for pasteurization at short notice. Pasteurization would have to be done under the direct supervision of the health officer, or it might not be done properly, and at present most health officers are not familiar with the process. The chief objection is that the customers would probably at once notice a change in the milk, especially if the outbreak was being discussed in the newspapers, and would stop their purchases. Dealers with whom I have talked vehemently oppose pasteurization unless they are already doing it. Again if the man who handles the milk on the delivery wagon is the source of the infection, pasteurization would be an injury rather than a benefit. Others as Slack and Trask, advise that if the source be not found, the business might continue if the methods used in producing and handling certified milk are adopted.

THIRD. The health officer might notify the public as to the probability of the infection of the milk, and advise them not to use it uncooked. This is theoretically the most scientific way to manage the outbreak, but its apparent lack of definiteness would not suit the public (a matter however of minor importance) and it is highly probable that it would injure the dealer's business almost, if not quite as much as officially suspending it.

FOURTH. The health officer may stop the dealers business and prevent the producers from sending in the milk through other channels. If authority to do this is not specifically given by statute, the published advice of the health officer that this should be done is probably sufficient. At present this seems to be the most practicable way of treating the problem. It is perfectly logical for the municipality to pay for the milk during the time that the supply is under investigation, but not after it has been determined that the dealer or his producers are at fault.

After it has been determined that there are persons sick or infected with typhoid fever in the family of a dealer, producer or their employees, what then is to be done?

A number of my correspondents insist on the removal of the infected person from the premises, but the majority think that strict isolation of the case is permissible. When we consider how often typhoid fever attacks nurses in hospitals, and how often it extends from one to another in private families, it seems unwise to allow persons who handle milk to live in the same house with a case of typhoid fever, or indeed any other contagious disease. The removal of the patient to a hospital can usually be accomplished without any great hardship, and when it cannot, the handlers of the milk can often be readily removed from the house. Public opinion will, I am sure, support this requirement, which is not usually a very onerous one. Utensils and everything used in the business should be sterilized.

The most difficult question is that of dealing with the well members of the infected families, the contacts. Most of my correspondents make no mention of the rest of the family, and presumably would ignore the danger of infection from them, a view in which I am inclined to concur. Trask, Goler, Winslow and Wheaton would make a search for carriers. Trask in his first letter advised that the feces and urine of all persons engaged

in the business should be examined bacteriologically, and their blood also should be examined by the Widal test, and if any give a history of typhoid fever, the excreta should be examined twice. In a subsequent letter he says that he does not believe that these stringent measures could be adopted successfully in the average community. There are certainly grave difficulties in the way of this procedure, not the least of which is the natural repugnance of most persons to submitting to the test. There are also technical difficulties in getting specimens, and the still greater difficulty in having the specimens properly authenticated. Moreover, as in most biological work of this kind a single negative result means little, and in the case of chronic carriers, whose elimination of bacteria is notoriously intermittent, several negative results would be far from conclusive. Again the popular objection to the search for carriers, and distrust of bacteriological methods, is sure to increase, as it becomes known that carriers when found, are likely to be permanently excluded from business.

Chalmers, Hill, Wheaton, Woodward and Scott advise the daily medical supervision of all persons in the infected family for a period of three weeks.

Kober, and, if I understand him correctly, Trask, would permit the continued sale of the milk without other precautions, provided it were pasteurized. Most officials, however, would stop the sale of milk unless the infected persons were removed or strictly isolated. None of my correspondents advocates the purchase and destruction of the milk by the municipality though this has been done. There seems to be no justification for it. Milk will not become infected with typhoid fever, scarlet fever or diphtheria, unless the handlers of it neglect the simplest rules of personal cleanliness. Dealers and producers have all been told this time and again, but they scoff at the suggestion of handwashing as foolish fussiness. It costs something to produce milk with a low bacterial count, but the prevention of specific infection by practicing ordinary cleanliness is not burdensome. Those who neglect to take precautions, as proved by the infection of their milk, should suffer the consequences.

Another question of very great practical importance is how long shall restrictions be enforced when typhoid fever is found among milk dealers or producers. I am sorry to say that most

of my correspondents evaded this question, though it is one to which every health officer is likely to be called upon to give a very definite answer. Abbott, Dixon, Trask, Woodward and Winslow advise that isolation be maintained, or other restrictive measures enforced until the patient is shown to be no longer a distributor of bacilli. To determine this, the feces and urine should be subjected to bacteriological examination, and Trask recommends that three examinations be made, a week apart. To apply these tests to the patient is doubtless easier, than it would be to apply them to all the contacts, but unless the patient is in a hospital, there might be some trouble in getting authentic samples. As it would probably be entirely impossible to apply such a test to the other members of the family, or to other handlers of the milk, and as at best it would be difficult if not impossible to apply it to the patient, and as even three negative examinations are not conclusive, it does not seem to me that this test at present should become a routine measure. It might perhaps be offered occasionally as an alternative to a long time limit, in which case the patient might be expected to see the necessity of co-operating with the health officer in the application of the test.

Several correspondents are decidedly opposed to fixing an arbitrary time limit for isolation in these cases, but Hill, Levy, Pease and Scott, perhaps rather grudgingly, admit that this may be the most practical method of dealing with the subject. Hill and Scott suggest six months and Pease three months. It appears to the writer that the evidence is that in the great majority of cases the patients are free from infection by the end of the third month after taking to bed, so that this is a fair working time to set for the period of isolation. It must be remembered that we have decided at present that it is impracticable to search for carriers among the contacts, and hence there is little wisdom in being over careful about letting the patient return to work, if by a moderate time limit we can avoid from 90 to 95 per cent. of the danger. Pease further suggests that in all these instances of milk infection, it would be wise to require as a condition of the resumption of business, the application of all the rules for the production of certified milk, and Kober urges pasteurization.

When typhoid fever is traced to a milk supply and no sickness is found among those engaged in handling the milk, but investigation reveals that a chronic carrier is the source of the trouble, the majority of the correspondents agree that the carrier must be permanently debarred from coming in contact with the milk in any possible way. A few demand that the carrier be removed from the premises, and this certainly would be the safer way. If such a person does remain on the premises it can never be certain that in some way the milk may not be contaminated, or some other person in the family, or among the employees, contract the disease, and if this occurred the health officer would be severely blamed. On the other hand, sometimes, as when the carrier is a dealer or farmer who has considerable money invested in his business, to compel him to give up all active interest in his business, is a very serious matter, and it is doubtful whether such a procedure would be sustained by the courts, or whether statutory provision for such action would be enacted by any legislature. Hill and Kober suggest pasteurization, and perhaps removal of the carrier from the premises or pasteurization, should be presented as alternatives.

In certain instances a milk supply will be implicated with almost a certainty, and yet the exact source of the infection may never be determined. If under such circumstances the supply is stopped, or the milk pasteurized, how long must these restrictions continue? According to some, these precautions must be continued indefinitely, but most of the correspondents showed no disposition to give a definite answer to the question. As such an unknown source of infection is as likely to be a mild missed case, as a carrier, much can be said in favor of adopting an arbitrary time limit as is recommended for cases of actual sickness. This might be three months, or perhaps less, or might be presented as an alternative to a hearty co-operation in a diligent search for carriers.

It will be noticed that in this discussion the writer has not urged a rigid search for infection by bacteriological methods. Without such a search it is impossible to locate all sources of infection. To attempt to control some of the sources of infection, even though they are the most numerous, and to ignore others, is of course illogical and inconsistent. But the manage-

ment of our common contagious diseases is and must be for the present, frequently inconsistent and illogical from a scientific view-point. We must carefully estimate the difficulties in the way of proposed action, consider the opposition to be aroused, the burden to be imposed on the individual or the public, the cost to the community, and what is particularly important, the results likely to be obtained. In view of all these considerations the following tentative suggestions of what should be done for the control of outbreaks of milk borne typhoid fever are presented for discussion.

1. Assuming a typhoid death rate not exceeding the average of American registration cities, the occurrence of two or three cases of the disease on a milk supply for from 100 to 1000 families, within a week, requires a careful investigation.

If the cases increase to 5 or 6 on a supply of, or less than, 100 families, or 5 to 2 per cent. of 100 to 500 families, or 2 to 1 percent. of 500 to 1000 families, and perhaps less than that on very large supplies, and no other connection between, or local cause for the cases, can be found, it is reasonably certain that the milk supply is at fault.

2. When a milk supply is found to be infected and the source is not determined it should be shut off or pasteurized. It is desirable to examine for typhoid bacilli all persons engaged in handling the milk but it is not feasible at present to adopt this as a routine measure.

3. When typhoid fever is found among those who produce or handle milk, the patient should be removed from all contact with the milk, and from all contact with those who handle the milk. There should also, of course, be sterilization of vessels, and observation of all exposed persons. Bacteriological search for infected persons is not feasible as a routine measure.

4. If a chronic carrier should chance to be found, such must be removed from the premises where the milk is produced or handled, and must not live with those who handle the milk.

5. When a milk supply is infected, the precautionary measures must be carried out for three months from the beginning of the last case among the milk handlers, except in the case of proved carriers, when they must become permanent.

DISCUSSION.

Dr. LUMSDEN. The literature on the epidemiology of typhoid fever heretofore has contained too many conclusions and too few carefully collected facts. It has been assumed on what appears to me to be rather insufficient evidence that Para-typhoid infection is conveyed by the same media that convey typhoid infection. We have some evidence to show that Para-typhoid infection is conveyed in some instances in the same way as is typhoid infection, but there may be some means by which Para-typhoid infection is conveyed which are different from those by which typhoid infection is conveyed. This possibility I think, makes it advisable to have cases of Para-typhoid recognized. There is a tendency on the part of some of our distinguished clinicians and bacteriologists in American to classify the whole group of fevers caused by typhoid and Para-typhoid bacilli as typhoid fever. I think such a generalization is unfortunate, and we should endeavor at every possible opportunity to have cases of Para-typhoid correctly diagnosed. In this way the facts collected in investigation of outbreaks may enable us to determine the means by which Para-typhoid is conveyed.

I was very much instructed by Dr. Chapin's paper on the Control of Milk Borne Epidemics of Typhoid.* In Washington we have found milk to be one of the important factors in the spread of typhoid infection. In the three years in which we have investigated the situation there we have had altogether five outbreaks definitely traced to milk infection. One of these outbreaks we traced to a bacillus carrier working on one of the farms and from which the implicated supply was obtained. This woman had typhoid eighteen years before, and since then had been apparently in excellent health. The faeces of this woman were shown by bacteriologic examination to contain a large number of typhoid bacilli. Fifty-four cases occurred in the outbreak. The last case developed twelve days after the woman had been recognized as a carrier, and the milk supply shut off from that farm. The outbreak occurred among the customers of two different dairymen, the cases occurring synchronously along the two milk routes. This confused us at the beginning of the outbreak. Upon investigation, however, we found that there was one farm which supplied both of the dairymen with a

* See page 29.

part of their milk supply. We directed our attention to that farm. A thorough investigation was made of the conditions on the farm and its surroundings but no history of any case of recent illness could be ascertained to account for the infection. We then thought of a bacillus carrier as possibly being the source of the infection and our investigations determined such to be the case.

This outbreak, I think, emphasizes the importance of keeping bacillus-carriers in mind when searching for the source of infection in milk-borne outbreaks of typhoid and, also, when considering measures to prevent typhoid infection from being introduced into milk supplies.

Dr. WOODWARD. There is one practical difficulty with respect to the management of milk outbreaks that I believe Dr. Chapin has not fully realized. Dr. Chapin says that when we discover a milk outbreak of typhoid fever and cause the dealer to discontinue the distribution of his milk, it is an easy matter to see that that milk does not reach the consumer through other channels. I think, however, that that is far from being the case. It may be the case when we are dealing with a single producer, but when we are dealing with a large retailer, a man handling milk from possible a dozen or, it may be, a hundred farms, the situation is very different. While in a case of that kind we might be justified in shutting off the milk of the retailer, yet we would ordinarily not have any definite ground for shutting off the milk of any particular producer. I cannot see the exact logic of Dr. Chapin's position, when he agrees with Dr. Pease, and I will say I also agree with Dr. Pease, that in most cases the infection of the milk has ceased before we discover the outbreak, and yet he at the same time would have us, as I understand him, forbid the sale of the milk without waiting to locate the focus of infection. In other words, the cause ordinarily ceases to operate before we know the outbreak is occurring, and yet notwithstanding this fact, Dr. Chapin, if I understand his paper, would have us forbid the sale of the milk without waiting to learn whether it has or has not done so. My own policy has been to wait until we can see something definite on which to act and then to deal with that particular focus. Very generally we have been able to do that. We have been able by a preponderance of the evidence to locate the infection except in some few cases. In a recent

case we had seven or eight cases which to a practical certainty we determined came from one farm. The outbreak discontinued, however, without interference by the Health Officer and the source of the infection was not determined. The date of onset of the latest case indicated that infection of the milk had ceased before the outbreak was discovered.

Dr. TORRALBAS. We have had no epidemic of typhoid fever in Cuba for quite a number of years. We only had a little outbreak of it, and through investigation we found the cause in the cultivation of the garbage in the plantations, brought in by Chinamen. The Chinamen use this as fertilizer, contaminated purposely, I am sorry to say, with the excreta of animals, and also fermentative organic matter. These cases appeared about four or five years ago I think, and since that time we have had no other epidemic of typhoid fever.

In regard to the other means of transmission of typhoid fever, the water supply, I am pleased to say that our water supply has not been infected since its establishment. It is spring water, and very seldom filtered by the poor of Havana, and yet we haven't any typhoid fever.

Dr. HURTY. I was very much interested in what was said this morning by the Superintendent of Health from Cuba. He related how he was confident that the boiling of milk in Cuba had had an effect no reducing the death rate. I heard Dr. John Guitaras talk upon the same subject in June of this year at Atlantic City, and was much impressed. Now is it not possible that the boiling of the milk in Cuba also settles this very problem? It destroys the bacilli, and the poisons also that might be formed in the milk to a large degree. We read in mythology when Prometheus brought fire down from heaven that he gave man sovereignty over the earth, and if we had better cooked our food for the many centuries past, we would have a better civilization than we now have. We would have strength and longevity and freedom from disease that we have not now, and if we would thoroughly cook all animal foods this problem would be pretty well settled. I have long since reached the conclusion that I will have no raw milk in my house and I do not have it. I think it is excellent, wise, rational, practical and businesslike to cook milk as well as other foods.

Dr. HILL. The autumn curve which Dr. Stokes' diagram showed has been explained in another way, i. e., as largely the result of returned summer vacationists coming in from the outside.

The handling of milk outbreaks when they occur is a matter of great interest. I think that Dr. Chapin is misquoting me when he says that I advised municipal pasteurization in every case of milk typhoid. It would be useless to advise pasteurization in many instances in small country towns where there are no public facilities at all for conducting it. The best way to handle a suspected milk epidemic at the very outset and before any definite evidence of the specific mode of infection has been found, I think, is to give the consumers orders to boil milk until you are perfectly certain that the milk supply is or is not infected. If it is infected then proceed to stop the milk supply until the particular infection can be found and removed.

Prof. WINSLOW. Professor Sedgwick and I published a paper on autumnal typhoid ten or twelve years ago, in which we said that we thought the reason for it was because the typhoid germ lived longer in the environment in hot weather. Then there was nothing said about the fly theory, and I think it is undoubtedly a factor in the transmission of the bacillus in the fall. We all tend to generalize from one or two things. There was a book published a year or two ago by Dr. Roberts, on enteric fever in India, which opened my eyes. He showed that among the English troops in India the typhoid occurred in the hot weather, and among the native troops it occurred the other way round. It seems to me that points pretty clearly to difference in vital resistance, as explaining in part the fact that white men who live in an ordinary temperate climate are more apt to get typhoid fever in hot weather. The spread of the germ, the vehicle of transmission and the vital resistance of the host are all factors. I do not think we shall ever get to the bottom of this question, or the tuberculosis question, until the matter of cooking milk is more fully emphasized, not merely on typhoid routes, but everywhere. Of course, there are occasional children who cannot digest pasteurized milk but they are rare. I do not believe that you gentlemen who are practical Health Officers will ever succeed in this fight completely until you preach and teach vigorously that raw milk is not a safe food. I am not

speaking of commercial pasteurization, but I do think it is a cardinal point to insist on the home cooking of the milk before it is used.

Dr. PEASE. I have in mind an outbreak of typhoid fever in which one-half of the cases were upon the routes of one dairy, but upon careful investigation of the amount of milk distributed by that one dealer we found that exactly one-half of the milk of the city was distributed by him, and that he had only the proportion of cases that he ought to have had, and yet some very good men jumped to the conclusion that the milk supply must have been the cause of the outbreak. A thorough statistical study of the situation was made, but was only possible because this health officer carried out his work in an ideal manner. He knew exactly how much milk each dealer was distributing and exactly from which farms or dairies it came, and thus having the records right at his finger tips, we were able on entering upon the investigations to make a thorough study almost immediately. We found that fifty per cent. of the cases were equally distributed among the other dealers. Taking all the evidence into account we were not long in coming to another conclusion, which was afterwards corroborated, namely, that the water supply was the cause of the outbreak. This illustrated the necessity for taking all factors into consideration, and making a complete investigation before drawing conclusions.

I think we could go on discussing this question of the autumnal rise in typhoid fever during the entire time allotted for our meeting. There is one fact, however, which speaks against Professor Winslow's statement regarding the variation in human vital resistance, according to the season of the year, as a factor in summer typhoid. I think it is a fact that in the cities now enjoying efficient water filtration, but which had high typhoid death rates due to polluted water prior to filtration, the summer typhoid rate was not much greater prior to filtration than at present. I know this to have been the case in Albany, New York. If now, vital resistance is a large factor in the incidence of Summer typhoid we would certainly expect a decline in the rate, when the opportunities for infection by water were practically eliminated. Personally I doubt the part of polluted water in the production of summer typhoid, unless the period from pollution to consumption of the water is very short.

THE RELATION OF TYPHOID FEVER AND THE WATER SUPPLIES OF ILLINOIS.*

By EDWARD BARTOW.

The work of the Lake Michigan Water Commission emphasized the fact that the typhoid fever death rate in the city of Chicago was much less than the typhoid fever death rate in the lake cities of northern Indiana. Lake Michigan is the source of the water supply for all of these cities. The water intakes of the Indiana cities are nearer the shore and are more affected by the Calumet River which pours into the lake the untreated sewage from a population of 500,000 people. The city of Chicago has, therefore, a much better water supply. The typhoid fever death rate in Chicago has decreased from 170 per 100,000 to between fifteen and sixteen per 100,000. The high rate was before the water intakes were extended farther into the lake and before the diversion of the city's sewage through the drainage canal into the Illinois River.

Because there are large cities having good water supplies which have a typhoid fever death rate lower than that of the city of Chicago and because we learned that the typhoid fever death rate of the city of Rockford, Illinois was only 7 or 8 per 100,000, it occurred to us that it would be of interest to compare the typhoid fever death rate of the city of Chicago with the rest of the state with a view to determining whether the outlying districts had a serious effect on the health of Chicago and also to learn if possible what relation existed between the typhoid fever death rate and the water supply.

The only published statistics available were the statistics for 1907 in the bulletin of the State Board of Health†. From the data there given the typhoid fever death rate per 100,000 for each county was calculated. The results of this work were so suggestive that it seemed worth while to carry the matter further. Through the courtesy of Dr. J. A. Egan, Secretary, and Mr. William J. Hoyt, Registrar of Vital Statistics of the Illinois State Board of Health the unpublished statistics of the

* Read before the American Public Health Association at Richmond, October, 1909.
† Monthly Bulletin State Board of Health of Illinois, February, 1908.

typhoid fever death rate for the years 1904, 1905, 1906 and 1908 were obtained. Using the estimated population for each year as calculated by Mr. Hoyt as a basis the rate per 100,000 for each county for each year and the average for the five years were calculated.

A study of the data shows that it is not possible to draw any definite conclusion from the rate during any one year. In Putnam county for example, the rate was 75 per 100,000 in 1904. There were no deaths in any other year. Putnam County is a small county so that a typhoid fever death rate of 75 per 100,000 was obtained from three deaths in a population of 4,000. The average for five years was 15. An epidemic at Streator in 1907 due to an infected water supply raised the rate in that year to nearly 30 per 100,000. In the other four years the rate was so low that the general average is below 20. The statistics for the whole state show considerable variation in the death rate from year to year. This is undoubtedly due to epidemics.

The average rate in each county for the five years is shown on the map. It is readily seen that the highest typhoid fever rate has been in the southern part of the state. We find only one of the southern half of the counties with an average rate of less than 10 per 100,000. This county, Douglas, is on the line between the two sections and as will be shown later is in an area of low typhoid fever. Only 2 other counties, Scott and Macoupin, have a rate below 15. In the northern half of the counties there are 13 with a rate below 10 and 10 more with a rate below 15. In the southern part also there are 8 counties with a rate above 40, and 12 more with a rate above 30; whereas, in the northern part of the state there is only 1 with a rate above 40, and 1 other having a rate above 30. That this record is dependent somewhat on the water supplies of the state can be seen by comparing this map with a map showing the distribution and character of the water supplies of the state. In the northern third of the state or better north of a line from Quincy to Lake Michigan the greater part of the water supplies are drawn from deep wells in rock. In this section there are only 3 counties with a rate above 25 and below 30, and 3 more with a rate above 20 and there are 10 with a rate below 10 per 100,000. In the middle portion of the state or rather in the east central portion of the state we find

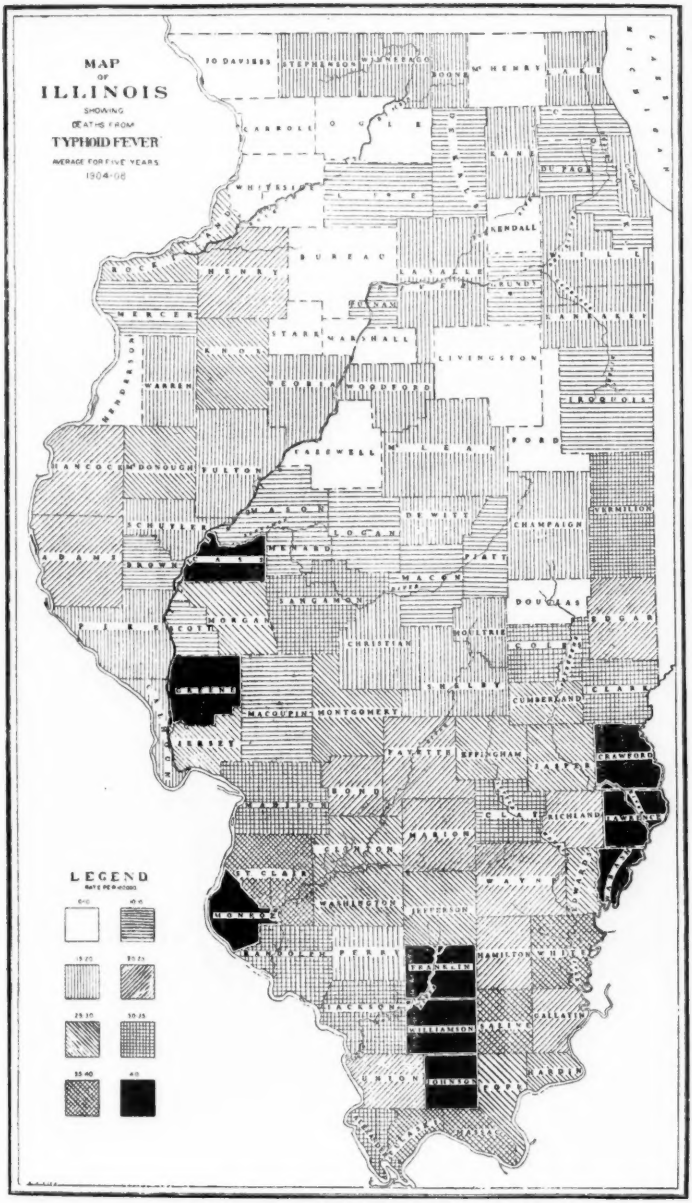
an area of glacial drift of 100 feet or more in depth. This drift covers with slight exceptions that portion of the state included by a line drawn from Lake Michigan south to the southern border of Edgar county, west to the west border of Shelby County, north to the middle of Logan County and west to the Illinois River, thence along the Illinois River to Peoria and north to the center of Bureau County and west to the Rock River and northeast along the Rock River to the Wisconsin line. Part of this section is in that area in which the water supplies are obtained from deep rock wells, but over one-half of the area has very few wells of this character, so that the low typhoid fever death rate in this section is due in part at least to the satisfactory water obtained from the drift. There is no county located entirely within this area in which the typhoid fever death rate exceeds 20 per 100,000. Not only can satisfactory municipal water supplies be obtained from the deep wells in the drift but many farms are also supplied by such wells. It is interesting to note that the one county in the northern half of the counties which has a typhoid fever rate of more than 40 is located outside of the deep drift area and that the one county in the southern half of the counties having a typhoid fever rate lower than 10 is located within the deep drift area.

In the southern portion of the state there is no opportunity to obtain a satisfactory water supply from deep rock wells because the water is salty. The drift is so shallow that it is impossible to obtain a sufficient supply of water for cities from the drift and individuals must rely on shallow drift wells for their water. In many cases dug wells of doubtful character are used. The large majority of municipal supplies in the southern part of the state are taken from streams. In most cases the water is used without filtration. In fact only 16 of the 60 water supplies obtained from streams, lakes or ponds within the state have filtered water. It is claimed in some of these towns that the water is used only for sprinkling or for manufacturing purposes, but it is difficult to prevent the use of such water for drinking purposes. Undoubtedly the high typhoid fever rate in the southern part of the state is due to a considerable extent to the lack of satisfactory general water supplies. Several communities are already considering the introduction of filtered

water and it is hoped that a better report of the typhoid fever conditions of the southern part of the state may be given in the near future.

It is interesting to compare Macon and Sangamon Counties. These two counties are in the same latitude and contain large cities, Decatur and Springfield. The typhoid fever death rate of Macon County is 14 per 100,000, while that of Sangamon is 37. This is undoubtedly due to the fact that Macon County is within the deep drift area and the water supplies for farms and private individuals can be obtained from deep drift wells, whereas Sangamon County is outside of the deep drift area and the farms must rely on the shallow wells for drinking water. Then, too, the city water supply of Decatur in Macon County is filtered, whereas the water supply of Springfield in Sangamon County is sometimes augmented by unfiltered water from the Sangamon River.

An inspection of the map showing the average would indicate that the typhoid fever rate of Chicago was not materially increased by infection from the neighboring counties. There are, in fact, no counties within 100 miles of Chicago which have a typhoid fever rate materially greater than Chicago itself.


MAP
OF
ILLINOIS
SHOWING
DEATHS FROM
TYPHOID FEVER
AVERAGE FOR FIVE YEARS
1904-08
LEGEND
JO DAVIESS
STEPHENSON
WINNEBAGO
BOONE
MCHENRY
LAKE
CARROLL
OGLE
DEKALB
KANE
DU PAGE
WHITESIDE
LEE
KENDALL
BUREAU
LA SALLE
GRUNDY
WILL
COOK
ROCK ISLAND
HENRY
MERCER
KNOX
STARK
MARSHALL
PUTNAM
LIVINGSTON
IROQUOIS
HENDERSON
WARREN
PEORIA
WOODFORD
FORD
HANCOCK
MCDONOUGH
FULTON
TAZEWELL
MCLEAN
SCHUYLER
MASON
DE WITT
CHAMPAIGN
VERMILION
ADAMS
BROWN
CASS
MENARD
LOGAN
PIATT
MACON
DOUGLAS
EDGAR
PIKE
SCOTT
MORGAN
SANGAMON
CHRISTIAN
MOULTRIE
COLES
GREENE
MACOUPIN
MONTGOMERY
SHELBY
CUMBERLAND
CLARK
JERSEY
CALHOUN
FAYETTE
EFFINGHAM
JASPER
CRAWFORD
BOND
CLAY
RICHLAND
LAWRENCE
MARION
CLINTON
WASHINGTON
WAYNE
EDWARDS
WABASH
ST CLAIR
RANDOLPH
PERRY
JEFFERSON
HAMILTON
WHITE
FRANKLIN
JACKSON
WILLIAMSON
SALINE
GALLATIN
UNION
JOHNSON
POPE
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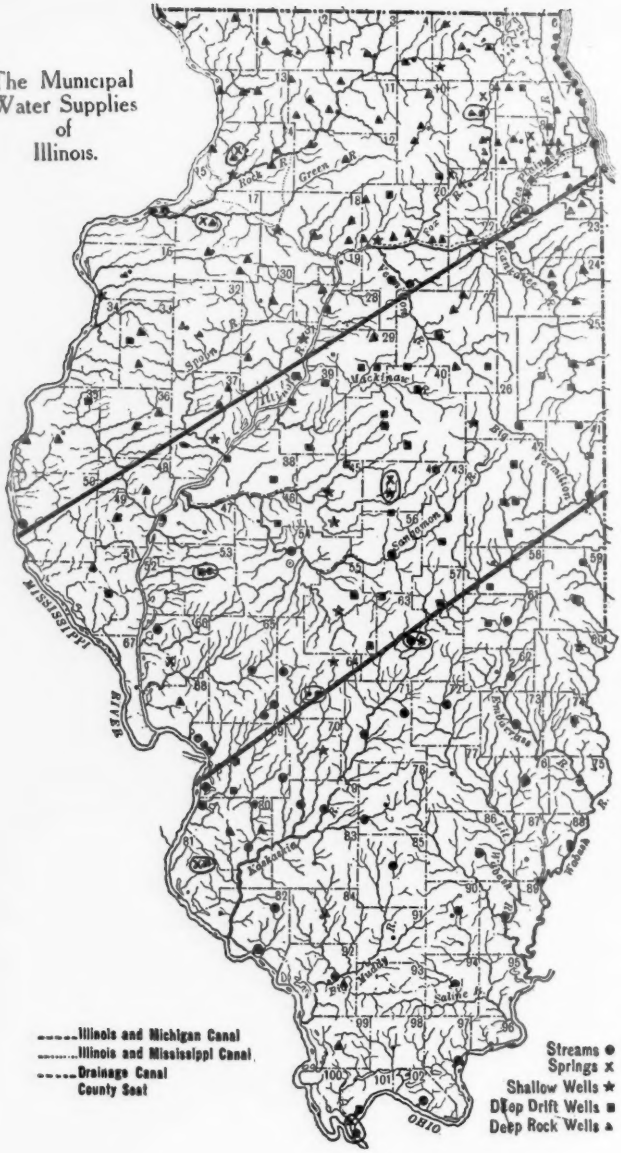
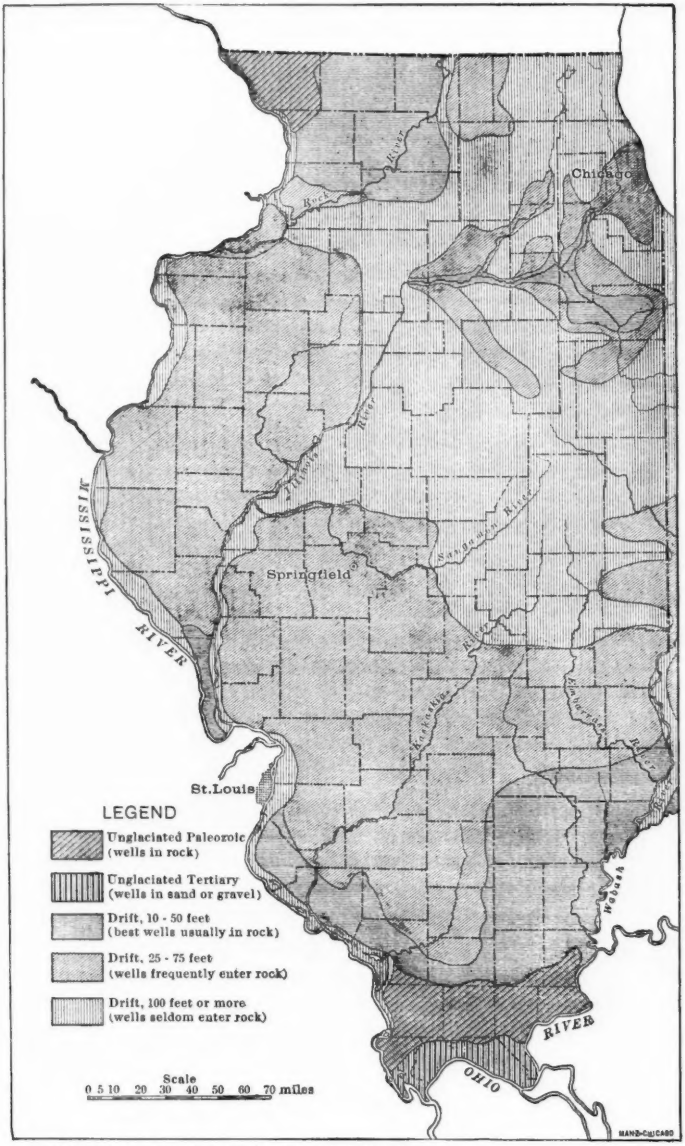
10-15
15-20
20-25
25-30
30-35
35-40
40

The Municipal Water Supplies of Illinois.




Chicago
Springfield
St.Louis
MISSISSIPPI RIVER
OHIO RIVER
LEGEND
Unglaciated Paleozoic (wells in rock)
Unglaciated Tertiary (wells in sand or gravel)
Drift, 10 - 50 feet (best wells usually in rock)
Drift, 25 - 75 feet (wells frequently enter rock)
Drift, 100 feet or more (wells seldom enter rock)
Scale
0 5 10 20 30 40 50 60 70 miles

Published by courtesy of the United States Geological Survey.

REPORT OF COMMITTEE ON TYPHOID FEVER. *

This committee was appointed at the Winnipeg meeting last year to consider the reporting of typhoid fever—not alone to emphasize its importance but also and chiefly, to suggest measures to impress physicians with the necessity of reporting this disease—a matter much neglected in many communities and even over the larger part of many states.

Until the physician, who is really the scout of the public health service, reports back the location of the enemy, all our paraphernalia with all its elaborate organization, is at a standstill. Our scouts must not alone be skillful in recognizing the enemy, but faithful in notifying headquarters.

With all said and done concerning the immense powers of the practicing physician to aid popular education and to advance public hygiene and sanitation, it remains true that the greatest service the medical profession as individuals may render, the one service it is incumbent upon them to perform, the one service they alone are able to perform, the initial step essential to any form of public control of infectious diseases, (i. e., prompt, faithful reporting) is the very service most neglected. The principles of Medical Ethics of the American Medical Association devotes two sections (Chap. III) to the duty of the physician to the community, and makes it incumbent upon him to "co-operate with the proper authorities in the administration and the observance of sanitary laws and regulations" and also to "give counsel" and to "enlighten the public" in regard to many sanitary problems, including the handling of epidemic and contagious diseases. But the specific instance of the conscientious diagnosis and faithful reporting of infectious diseases as the great basic duty of the physician is nowhere directly mentioned.

Physicians hardly need encouragement to advise communities as to their sanitary problems for they generally do it voluntarily, and not always with the best results, for few practicing physicians are equipped to enlighten the public on the intricacies of modern professional public hygiene. On the other hand many physicians fail in the duty which lies nearest to them, peculiarly in their own province—diagnosis and report.

* Read before the American Public Health Association, at Richmond, Va., Oct., 1909.

Your committee divided the subject as follows:

1. Why the physician should report.
2. Why he often does not report.
3. What can be done to induce him to report.
4. A recommendation that the committee be continued or another appointed to approach the American Medical Association with representations on the subject and a recommendation that the American Medical Association definitely announce and urge through the code of ethics the reporting of infectious diseases, not in a perfunctory manner or under compulsion, but as a high ethical duty to humanity and to the medical profession itself, much more important than those duties to the public now specifically listed and which very often prove to be beyond the training and experience of the practicing physician to perform.

Each member of the committee contributed to the subject, and the chairman has approached the American Medical Association in the effort to determine how such a proposition would be received. Your committee believes that a conference committee, consisting of the members from each association might well be asked for, in order that such questions as the American Public Health Association may wish to lay before the physicians of the country, or such suggestions as the American Medical Association may wish to lay before the professional public hygienists, might have a definite channel through which to pass.

With regard to the other subdivisions of the report, Dr. John F. Anderson contributed the following section:

REASONS WHY PHYSICIANS DO NOT REPORT TYPHOID FEVER.

(a) LACK OF APPRECIATION OF THE IMPORTANCE FROM AN EPIDEMIOLOGICAL STANDPOINT OF A PROMPT REPORTING OF CASES OF TYPHOID FEVER. Many physicians have but a very slight idea what purpose the notification of typhoid fever plays in the control of the disease. They seem to think that the health officer uses the data only for the construction of "tables" overlooking the fact that unless we know how many cases of typhoid fever there are, where they are, and where they began, we can never hope to trace the source of infection or to lessen the ravages of this great scourge.

(b) DISINCLINATION TO INCONVENIENCE THE PATIENT'S FAMILY, FOR PERSONAL, SOCIAL, OR BUSINESS REASONS. Many people when told by their physician that there is a case of typhoid fever in the family bring pressure on him to prevent the case being reported, and often the physician either fails to report it at all to the health officer or reports it as something else.

(c) UNCERTAINTY OF DIAGNOSIS. We all know how difficult it is in certain cases to make a clinical diagnosis of typhoid fever, and in such cases in the absence of the classical signs and symptoms and with no or a negative Widal, the physician does not care to report the disease as typhoid fever while he very probably believes that it is.

(d) PROCRASTINATION; HE INTENDS TO REPORT IT BUT PUTS IT OFF FROM DAY TO DAY. Very many times the physician has made his diagnosis perhaps early in the attack, but puts off reporting the case to the health officer, for no real assignable cause, until finally the patient is well and then he thinks it is too late.

The sections to be contributed by Dr. Chapin and Dr. Levy were on another subject, i. e., the simplification of reporting, a summary of which is as follows:

THE SECURING OF REPORTS FROM PHYSICIANS.

1. A very simple form of written report alone should be required, practically merely such as will enable the health officer to locate the case, the object being to get the central fact of the existence of a case at a certain place—regarding this as all the physician should be asked to do, and looking upon the immediate investigation of the case, with the collection of all the data and the institution of preventive measures as wholly the duty of the health department. Dr. Chapin accepts telephone or verbal reports gladly.

2. Every facility for diagnosis should be supplied by the health authorities, in order that the physician may be aided in arriving at a conclusive diagnosis early and also may be unable to excuse non-reporting on the ground of indecisive diagnosis. Dr. Chapin is inclined to believe that the sending of an inspector to make the tests on the physicians' request in doubtful cases

would simplify matters for the physician and induce greater use of these means and hence better reporting.

3. The best means of securing reports from physicians however is the making use of them early and energetically to the benefit of the patient and to the benefit of the community. There is indeed a general consensus of opinion amongst all public health men that the greatest reason for neglect of reporting by physicians is the belief on their part that the only value of the reports is in padding annual health department statistics. Where this is true, the health department is not doing its duty, and undoubtedly the most efficient and rapid method of bringing the physicians in any locality to realize the value of prompt and early reporting, is to use these reports promptly and wisely, not neglecting also to make it very evident to all concerned that SUCH USE IS MADE of them.

Signed,

JOHN F. ANDERSON,
E. C. LEVY,
CHARLES V. CHAPIN,
H. W. HILL, Chairman.

NOTE: The committee was continued in accordance with the recommendations made. H. W. H.

UTILITY OF THE DOMICILIARY VISIT IN THE CAMPAIGN AGAINST YELLOW FEVER.

By Dr. CARLOS MANUEL GARCIA,
Medical Inspector Third District, Vera Cruz, Mexico.

A slight epidemic of Yellow Fever which suddenly broke out at the end of May in last year, in the important port of Laguna del Carmen, in the State of Campeche, Mexican Republic, furnishes me with an opportunity of speaking a few words with respect to the utility of the domiciliary visit in the struggle against that much feared disease, a simple and rapid system of defence which was suggested by my Chief, the President of the Supreme Board of Health, which domiciliary visit is combined with other means for extinguishing the infection, of which we also know, that is to say: the isolation of confirmed or even suspected cases, and the destruction of the larvae and infected mosquitoes.

Before going any further, I must frankly state that the ideas which I at one time held with regard to quarantine have been radically altered since I have had opportunities to see for myself the magnificent results which we have obtained without the necessity of appealing to such a costly and arbitrary method for the preservation of public health. On the contrary, I now believe that the domiciliary visit as practiced in accordance with the teachings of the President of our Supreme Board of Health constitutes the practical and happiest application of the immortal discovery of Dr. Finlay.

As time would not allow me to enter at length on a study of the probable origin of this epidemic, I will omit it; but at the same time I must remind you that a well confirmed case of yellow fever, which may from one moment to the other come under our observation, must always lead us to presume the existence of one or more other cases, which, through special circumstances for example, the insidious manner in which it presents itself to our view, has passed unnoticed in its evolution. These circumstances are precisely those which have given rise to

*Read before the American Public Health Association, at Richmond, Va., Oct., 1909.

the doctrine that in those places in which Yellow Fever is endemic it is maintained alive by the children under ten years of age who are natives of the locality, as it is supposed that at that tender age these children are attacked by very mild forms of the disease, which is susceptible at the same time to being propagated by mosquitoes. As we have not yet obtained the experimental sanction of this doctrine, acting in accordance with the knowledge we have of these very mild forms of Yellow Fever we can understand the absolute necessity of isolating at the earliest possible moment, every non-immune, amongst whom I would include the children under ten years of age, even though natives of the locality, who present any feverish symptoms, which are not proved to proceed from some cause which cannot be attributed to Yellow Fever.

It is therefore easy to understand, that in order to carry out this isolation in a conscientious way we must first make methodical domiciliary visits which would allow us to make a judicious selection between the immunes and non-immunes. It is precisely this simple practice which characterizes our system of defence and constitutes its chief merit. I repeat that it was precisely this simple method which led to such a successful termination of the epidemic in Laguna del Carmen as well as in the Port of Vera Cruz, and which we hope will very soon be implanted in all other sections which are subject to sudden attacks of the expiring Yellow Fever.

THE CAMPAIGN AGAINST YELLOW FEVER ON THE ISTHMUS OF TEHUANTEPEC.*

By Dr. FRANCISCO VALENZUELA,
Mexico City, Mexico.

ORGANIZATION AND RESULTS.

The importance of the international traffic across the Isthmus of Tehuantepec has of late years brought to that beautiful region of our territory, so well adapted to agriculture and trade, a great number of people from distant states of the republic and from foreign countries, who have considerably increased the number of persons who are not immune to tropical diseases and principally to yellow fever, whose consequences are of such a fatal character. The number of victims who formerly succumbed to this terrible disease in the towns of greater or lesser importance and on the rural properties of the Isthmus was very considerable, the greater part of them having arrived there from remote and different climates, to take their chances in the hot country.

The agricultural conditions of this fertile and beautiful region, as well as its geographical situation, led to the establishment and development of international traffic across the Isthmus, which very soon assumed enormous proportions, on account of the easy and rapid communication between the terminal points, Salina Cruz and Coatzacoalcos. The traffic which was established by land and sea, and the arrival of non-immunes in a region in which yellow fever prevailed with sovereign power, led to a great increase in the number of victims, amongst whom were several nuns who had gone to establish themselves in Tehuantepec and died in the epidemic of 1904, as well as several passengers who adopted that easy route and also fell victims to yellow fever.

The satisfactory results obtained by the campaign against yellow fever, which, in accordance with the doctrine established by Doctor Finlay, had been undertaken in Vera Cruz, formerly the most prolific focus of that disease on the gulf coast, after

*Read before the American Public Health Association at Richmond, Va., Oct. 1909.

Havana, decided our government to extend this important service to the Isthmus, with which it had just been connected by the Veracruz and Pacific Railroad, now denominated Veracruz to the Isthmus, whose terminal point is in Santa Lucrecia. This line connects with the National Tehuantepec Railroad, which runs from Salina Cruz to Coatzacoalcos, now Puerto Mexico, and touches numerous towns of commercial importance as well as rich agricultural properties.

The Supreme Board of Health gave the necessary instructions for the organization of this campaign on the Isthmus, to Doctor Carlos Manuel Garcia, who has so efficiently contributed to the success of that service in the Port of Veracruz. A similar organization was established on the Isthmus under the same auspices as in the former port, and, due to the energy and capability of Doctor Garcia, that campaign was organized in the City of Tehuantepec in May, 1904. It was subsequently extended to the whole of the Isthmus, first in the southern part and afterwards in the northern, in which section of the State of Veracruz the campaign was initiated by Dr. Narcisco del Rio and continued by Dr. F. Gutierrez under the same form which was given to it by its initiator, according to the instructions of the Supreme Board of Health. That service is kept up to the present day. The excellent results obtained cannot be less than highly satisfactory and are a subject of congratulation to all who care for the health of our country, because we see in it a solid foundation for our progress and public wealth.

I will now proceed to give a resume of the principal points which have demanded attention during the campaign against yellow fever on the Isthmus, explaining its organization, importance and results.

The passenger traffic is under the charge of Sanitary Agents who travel on board the cars of the Tehauntepec Railroad, and whose jurisdiction extends to the respective zones of Cordoba, Salina Cruz and Coatzacoalcus, where the Chief Agents reside. This point is closely connected with all these railroad lines and they keep a watch on all the traffic, as well as on the terminal points above-mentioned. The travelling agent on the cars takes careful notes of the passengers, showing the point they come from and the point they travel to. Whenever one of these

is found sick, the Agent investigates as well as he can the circumstances under which the disease has been contracted, the principal symptoms, such as temperature, etc., which would facilitate his determining those points. He also takes into consideration the sanitary conditions of the locality from which the sick person comes, and takes all the necessary precautions. Whenever the symptoms presented give rise to any suspicion which is corroborated, he increases his precautions, and reports to the Agent on the train with which the passenger desires to connect, together with such observations as he has been able to collect. At the same time he forwards a report to the sanitary authorities of the place the sick man is going to, in order that he may be submitted to strict surveillance until the disease from which he suffers is clearly defined and the proper measures can be taken. The Agent or Agents who may have discovered any such case, make a full report on arrival to the respective Chief of the service, who then takes the steps which the case may require.

In the course of his trip, the Travelling Agent collects all the news which the political and sanitary authorities may give him, and in his turn reports them to the nearest Chief of the service, by wire if the case so requires. This service is of very great importance, as it enables the respective sanitary authorities to receive daily and timely reports of all cases of disease which present an alarming character, and also to take the necessary steps for the isolation of the case and attendance, whether the patient was found on some car or a resident of some town.

The railroad cars are fumigated on their arrival as well as departure from their terminals, so as to destroy the mosquitoes which might be found inside. The substance employed with great advantage over all others known is sulphurous acid (20 grams to 1 cubic meter) which kills them with promptitude and certainty and the same substance is employed whenever it is necessary to fumigate any vessel.

The results of this service are evidently of great utility and efficiency, because by the prompt isolation of the patient and other precautions taken the principal source of propagation is destroyed and the subsequent surveillance exercised determines the nature of the disease. The daily reports which the Chiefs of the service receive from the Travelling Agents give them an

exact knowledge of the sanitary conditions of the region travelled by those Agents and permit them to rapidly take all the steps which may be necessary to restrain and even extinguish the disease.

Town Service. This service is permanent in the more important towns of the Isthmus, whether for the number of inhabitants, as in Tehuantepec (15,000), or for their importance to traffic, as Salina Cruz, which now has 3,000 inhabitants and formerly 8,000, as well as Coatzacoalcos with 10,000 inhabitants, bearing in mind also the floating population, amongst which are a great many non-immunes. In the towns of minor importance, it is established only when the circumstances require it, without prejudice to a constant vigilance which is exercised by the resident political and sanitary authorities.

The staff employed in this service is in proportion to the importance of the town and is distributed therein by zones, over which vigilance is exercised as follows: They keep a register of the people in which they note those who are immune or non-immune who live in the respective zones; they investigate whether any are sick, the nature of the disease and the attendant circumstances; they watch over the isolation of the sick, in case this is necessary, and also over those who arrive by railway; both the latter as well as the residents of the town are taken to the lazarettes, whenever their dwellings are such that they cannot guarantee a strict isolation. They fumigate those dwellings so as to destroy the mosquitoes which may have been inoculated, by means of sulphurous acid, 20 grams sulphur to 1 cubic meter, and they spread oil over the ponds and swamps in order to destroy the larvae of the mosquitoes which they might contain. The chief of the sanitary brigade presents a daily report of the work done and of everything he may have observed within the zone under his care, to the Chief Delegate, who in his turn sends a telegraphic report to the President of the Supreme Board of Health.

The isolation of the sick, the destruction of the mosquitoes by fumigation and the covering of ponds and swamps with oil to destroy the larvae, result in the disassociation of the three principal factors in the propagation of yellow fever. The satis-

factory results thus obtained, are constantly confirmed by statistics.

Country Service. The numerous agricultural properties which exist on the Isthmus have been invaded by this terrible disease and suspicious cases sometimes appear there whose character it is necessary to define. The same thing happens in the small hamlets occupied by natives of that region, many of which are found on the banks of the rivers, surrounded by swamps and therefore propitious to the development of mosquitoes. In all these cases the health of the people is watched over by the proprietors or managers of the properties as well as by the municipal authorities, who as soon as they note the presence of any person suspected of sickness notify the nearest sanitary officer by wire or telephone, and the latter either personally or through his subordinates proceeds to take the steps which may appear necessary. The assistance which is generally found both amongst the inhabitants as well as the authorities is of great importance, and this is due to the information which little by little has been spread among them by means of the pamphlets which the Supreme Board of Health has profusely distributed and which have been specially written for the superintendents of traffic on the railroads, for the proprietors of country properties, for the resident authorities and physicians, and for general information. These pamphlets give clear and concise instructions on the principal factors in the propagation of yellow fever, the means now at our disposal for its suppression, and the practical methods for taking advantage of those means.

The timely information which the sanitary authorities may obtain of the existence of any suspected case allows them to take prompt measures for preventing the spread of the disease and even for suppressing it altogether. The resulting defining of the nature of the disease and taking prompt measures to prevent its spread and secure its extinction not only are of great benefit but also re-establish tranquility in the region affected and its neighborhood, as well as throughout the country and abroad, thus preventing any serious impediments in the way of international traffic. Wherever this sanitary service is established the methods adopted are of a uniform character, and amongst them I must mention the use in dwelling houses of fumigation with the

assistance of the canvas covering invented by Dr. N. del Rio, who rendered such important services in the campaign against yellow fever in Veracruz. This canvas cover is extremely useful because it is specially adapted to the houses of that region, as it completely covers the hut in the interior of which the fumigation is made with sulphurous acid (20 grams per cubic meter), which slowly penetrates the interstices of the thatch with which they are covered, thus killing all the mosquitoes which take refuge there, which cannot escape on account of the canvas cover.

In some places in which the land is very swampy and where cases arise of an alarming character, mosquitoes are found as abundantly of the genus Anopheles as of the Stegomia, and it is necessary to examine the blood of the patient so as to form a diagnosis of his disease. In the month of August, 1908, in a small village of 400 inhabitants called Huilotepec, distant 10 or 12 kilometers from Veracruz on the right bank of the River Tehuantepec, a disease rapidly spread which greatly alarmed the residents. The Sanitary Chief in Salina Cruz proceeded to that place as soon as he had notice of the epidemic character of the disease and promptly took the necessary measures, of which the principal were the isolation of the patients and the fumigation of the houses. An examination of the blood of some of these patients demonstrated the presence of the Laveran Hematozoaria and the satisfactory results obtained by their treatment, principally with quinine, confirmed the first diagnosis, although the disease had presented itself in a truly alarming aspect. This method is very valuable in determining the nature of the disease in individuals who live in secluded places, as without prejudice to their isolation the disease is promptly diagnosed and treated as required.

I have had the honor to present to this learned Association, a resume of the organization and results of the campaign against yellow fever on the Isthmus of Tehuantepec, which have been confirmed by the statistics of the last three years, and which show how yellow fever has disappeared from the Isthmus. It is a subject which proves its importance for itself, as it will give the entire American continent a knowledge of our sanitary conditions and will confirm the confidence and guarantees which our ports offer to countries which have trade relations in Mexico. In the

meeting held on the 7th of December, 1907, of the third Pan-American Sanitary Convention, in the City of Mexico, Doctor Wyman frankly expressed on behalf of the United States his admiration for the worthy President of our Supreme Board of Health, in the following terms: "The United States cannot be behind hand in expressing their admiration for Doctor Liceaga. We are his nearest neighbors and for many years have heen the witnesses of his earnest efforts in favor of Hygiene and Public Health. Nowhere has Doctor Liceaga more sincere admirers than in the United States, and we desire that this assertion should be taken at its full meaning, and will also take great pleasure in subscribing any document which may express such sentiments."

If these spontaneous and sincere expressions on the part of the distinguished American physician were only inspired by the efforts at that time made in our campaign against yellow fever as undertaken on the Isthmus of Tehuantepec, now when success has crowned those efforts, the expressions of confidence in the public health of Mexico, as personified by Doctor Liceaga, will certainly merit the approval of each and every one of the worthy representatives of the American republics who are here present.

ANNUAL REPORT ON YELLOW FEVER IN THE MEXICAN REPUBLIC, FROM AUGUST 16, 1908, TO DATE.*

By Dr. EDUARDO LICEAGA,
President, Superior Board of Health, Mexico City, Mexico.

For the last sixteen years I have presented in every annual meeting of this Association, a report on the course of Yellow Fever in the territory of the Mexican Republic. I now appear before you again to fulfill this engagement which I have assumed with the Association, and present a report of the cases of Yellow Fever which have been observed from the 16th of August, 1908, to the 5th of October, 1909. During this period of time, cases have been registered in the City of Veracruz, in the months of September, October, November and December of last year, whilst in the current year we only had one case in January and another on the 11th of February. To these I must add a case which was imported on the 24th of September last, and which was at once isolated after being landed, and the ship disinfected. This patient died in the Hospital.

As can be seen, from the 11th of February of this year, when a single case was observed, we have not had another autochthon in that Port. I desire to impress this point on my hearers, because we have been unable to find any explanation of the following case:

A Spaniard named Federico Gallo Mancilla, a resident of Puebla for the last three years, went down to Veracruz on the 12th of June last, and remained there until the 16th, when he took passage in the Steamer "Furst Bismarck," of the German Line. On the second day after embarkation he fell sick, and on the 19th, when he reached Havana, he was isolated in the "Las Animas" Hospital. There it was ascertained on the 22nd of June that he was really suffering from a mild form of Yellow fever. This case has given rise to a controversy between the sanitary authorities of Mexico and Cuba. The latter have maintained that the disease was contracted in Veracruz.

As no case whatever has been observed in that Port since the 11th of February of this year, if we admit that Gallo Mancillo contracted the disease in Veracruz, we would have also to admit

*Read before the American Public Health Association at Richmond, Va., Oct., 1909.

that an infected mosquito had remained since February and that this mosquito had stung Gallo Mancilla and inoculated him with the Yellow Fever. But if we admit this theory, we must also admit this other; that Gallo Mancilla had the special privilege of being stung by an infected mosquito which did not sting any other of the ten thousand non-immunes who constantly reside in Veracruz, during the time which elapsed from the 11th of February to the 16th of June, and that this infected mosquito did not inoculate any of the ten thousand non-immunes who have continued to reside in Veracruz from the 16th of June to the present date. Neither of these theories is admissible.

In the Island of Cuba it appears that the following supposition prevails: that the children who are born there, contract Yellow Fever in a very mild form and with symptoms which can hardly be noticed, and it is supposed that these children infect the mosquitoes which later on give rise to the isolated cases which appear to be spontaneous. In the case of Gallo Mancilla we cannot accept this explanation, because then we would have to assume that a mosquito infected by a child suffering from an anomalous form of Yellow Fever only stung Gallo Mancilla, without stinging, either before or after, a single one of the ten thousand non-immunes who reside in Veracruz.

The case I refer to has up to the present received no satisfactory explanation, but I present it as a well established fact.

It may be said that the State of Yucatan is where isolated cases of Yellow Fever persist in appearing even now, because although it is true that small epidemic foci existed in the last months of the past year, in this we have observed only isolated cases, six in January, two in March, one in May, one in June, two in August and two in September, and none at all in the months of February, April, July and October up to the present. We therefore see that there is no epidemic in Merida at present.

With respect to the cases observed from November, 1908, to the date of this paper, in different villages or country properties of the State of Yucatan, they will be better understood from the diagram which I have the honor to present together with this report. As a summary of that diagram, I may state that from the 11th of February of this year not a single autochthonic case of Yellow Fever has been observed in Veracruz; that neither has the disease presented itself in any other Port of the seaboard of

the Gulf of Mexico during the period elapsed from October, 1907, to date, with the exception of those cases in Laguna del Carmen which I reported last year, and also that observed in Frontera, which was imported, as stated in that paper; and that at present there is no epidemic in the State of Yucatan, but only some isolated cases in Merida and in some of the villages or plantations round that city.

Every week I send an official report on the course of Yellow Fever in our country to all the Republics which have accepted the Sanitary Convention which was subscribed in Washington on the 14th of October, 1905.

I must make the following declarations to the members of this Association:

The campaign against Yellow Fever, which commenced in the Mexican Republic in the year 1903, has continued uninterrupted up to this date, without even suspending it during the Winter months as is done in other countries; that the war on the mosquitoes is so efficacious that there are none left in Veracruz, and consequently, there are no stegomyas, as demonstrated by the reports rendered by the physician of the Public Health and Marine Hospital Service of the United States, who is resident in that Port.

The cases which have been observed in Merida and surrounding villages, arise from the existence in that city of over thirty thousand water tanks which could not be so easily and securely watched as those of Veracruz.

In the entire section which was formerly devastated by Yellow Fever we continue to canalize the deposits of standing water and to fill up the hollows, as well as to spread oil on all those ponds which cannot be otherwise filled in or covered.

We continue to fumigate the dwelling houses, workshops, schools, etc., in which we have encountered either cases of Yellow Fever or any suspected cases.

We continue the surveillance over the passengers who travel by rail in any part of the region which formerly suffered from Yellow Fever, and this service is especially active along the line of the Tehuantepec Railroad.

In the Ports of Coatzacoalcos, on the Gulf Coast and Salina Cruz on the Pacific, it is nearly four years since a single case of Yellow Fever was observed.

DISCUSSION.

Dr. WALTER WYMAN, Washington, D. C. These three papers which have just been read I have listened to with a great deal of interest. The papers, and the fact of their presentation here, gives evidence of the care which is being taken by the Mexican authorities in suppressing and eliminating this dread disease of yellow fever. The contents of these papers shows that they are doing it.

Two years ago in the City of Mexico at the International Sanitary Convention of American Republics, Doctor Liceaga, the distinguished President of the Superior Board of Health, made the astonishing claim that they had eliminated yellow fever from the Republic of Mexico. It made somewhat of a sensation, and of course something akin to a small interrogation point arose in the minds of some of us, but we listened with respect, for we know what they had done; and I want to say that since that date, and especially during the last summer, the results have really justified that statement. When you think that only a few years ago Vera Cruz was one of the worst infected ports on the western continent; that it was a constant menace to the United States; and that now, through the scientific and sanitary efforts of the Mexican Government, inaugurated by Doctor Liceaga and backed up by President Diaz, it is free from that infection, I think you will all agree that the present status is a remarkable evidence of the intelligence and energy of our southern neighbors.

Not only did Doctor Liceaga say that he felt they had eliminated yellow fever from the Mexican Republic, but he said that the forces which they had been using to that end are now turned against malaria, and that they expected to eliminate malaria from the Mexican Republic. Gentlemen, that is not only a work, an ambition, and an expectation that is worthy of commendation, but it is something that should stimulate us. I believe they have given more attention to the destruction of the mosquito and the elimination of malaria and yellow fever than we have in this country, and we really can listen to them in this respect. The past year has been one comparatively free from yellow fever in other countries as well, but it is due, I believe, to the increased attention that is being paid to sanitation all along

the Spanish Main and the South and Central American Republics. Yellow fever is practically eliminated from Rio Janeiro. This is not a haphazard result, but is due to sanitary measures. Of course, we know about Cuba and the Canal Zone, and without doubt the honest and effective work in these two countries has had a marked effect by example. Then, too, the presence of medical officers of the Public Health Service, detailed in some eight or ten of the fruit ports in Central and South America, to make sure that the ships shall be free from infection before leaving, has had a sanitary influence on these Republics.

Whether all who are here feel a special interest in the matter of yellow fever or not, it is a cause for congratulation that a disease which used to sweep over this country, and infected constantly all our neighbors, appears now to be practically wiped out. Of course, one swallow does not make a summer, and one or two summers of freedom from general infection is not enough to make us rest content, but still it is very encouraging, and it looks very much as though we had conquered in this western hemisphere the disease called yellow fever. (Applause.)

Dr. PETER H. BRYCE, Ottawa, Ont. I wish to add for myself, and I think for all the representatives of my country a word of tribute to the splendid—one might say heroic—efforts of Dr. Liceaga and his splendid Board of Health in the stamping out not only of yellow fever but in the true work, the greatest work we are all engaged in, that of public hygiene. When I listened for two hours this morning to the discussion of the splendid papers on typhoid fever, and listened to the expressed expectation as a matter of course of those who read the papers of a certain level of typhoid in the different cities being maintained year by year—as I heard the story of flies as the common cause of it in certain southern districts and northern districts as a thing to be expected, and then when I turned and listened to the splendid story of the results of public health efforts in a country where I dare say the fight is more difficult against the foe, still very well intrenched because of the difficulties of getting at him, and when I realize how easy a problem we have in controlling great epidemics like typhoid fever by the municipal regulation of water and milk, and when I see that we are not putting up any

very positive fight to this end, I feel that we can hardly congratulate ourselves in the northern states for the fight which is being waged against typhoid fever while we must admire the performance of the magnificent task that Dr. Liceaga and his Board has taken in hand and accomplished in stamping out disease. It makes no difference whether it is typhoid fever, smallpox, yellow fever or indeed tuberculosis, which we are all fighting against today. The only question we have to ask is: Are all fighting effectively? I cannot withhold my tribute to the splendid example set us by Dr. Liceaga and the splendid Board of Health of Mexico City.

Dr. FREDERICK TORRALBAS, Havana, Cuba. The yellow fever is a question always very important to Cuba, and in this case I am obliged to say a few words about it and touch upon a few points which have been considered in the three very interesting papers sent by our brothers of the Republic of Mexico.

In the first place, in the paper read by Dr. Garcia of Mexico, in which he refers to the house to house inspection, I might say that Havana is today in such a condition in that line that we control entirely the history of any case of yellow fever which may occur from its very beginning. For this purpose we have sixty-two District Inspectors who are in charge, visiting every house in Havana, and making an average of twenty thousand houses every ten days, which would cover the whole town a little less than three times during a month. These Inspectors are supposed to look after the whole sanitary condition of the house and more especially the work connected with the destruction of mosquitoes. The Inspector has an assistant with him who is supposed to go to every house, and destroy all deposits of larvae which may have been deposited since his last visit. In that line we have made such a good record that in twenty thousand houses inspected larvae were found in only fifty-two. We have fought not only typhoid fever but also malaria to such an extent that the medical students in Havana very seldom see a case of malaria. (Applause.) They have to be taken down to Los Animas Hospital where we get only the cases imported or brought in from the interior of the country. I am very sorry that Dr. Liceaga is not here to discuss a case of yellow fever that

we had, I think imported from Vera Cruz this last year. Dr. Liceaga states that in the Island of Cuba it appears that the following superstition prevails, that children who are born there contract yellow fever in a very mild form, and with symptoms which can hardly be noticed, and it is supposed that those children infect the mosquitoes, which later on give rise to the isolated cases which appear to be spontaneous. This is true, and in the last epidemic we had then as witnesses quite a good many officers of the United States Army well posted in all sanitary matters, and they saw three cases. I remember one of them, and I mention this case because it created quite an excitement in Havana. The child was only four years old and just at the beginning of the epidemic it got sick and was reported by the attending physician as a case of dengue, which was prevailing to a slight extent at the time. The case was taken up before the Commission on infectious diseases, which is composed of members of large experience, at the head of which is a man very well known in the United States as an expert in yellow fever, Dr. John Guiteras. The case on the third day was postponed, but not in the same way as the cases that are not diagnozed as yellow fever. They postponed the case, and immediately thereafter ordered disinfection of the house. This child was living about five miles from the place of infection, but the day before he took sick he came to the harbor to meet friends on a boat coming from Mexico. He was not allowed to go on board on account of the law prohibiting all non-immunes to go on board vessels coming from infected ports. This child had no connection whatsoever with any of the foci, nor did any other case develop later in the surrounding blocks, nevertheless the case was pronounced one typical of yellow fever in a child five years old by the Commission, acting unanimously. I mention this case because of this statement in Dr. Liceaga's paper.

I would like to refer to the use of canvas. We have been able to disinfect in that way towns of fifteen thousand inhabitants in a single day.

Dr. W. M. BRUMBY, Austin, Texas. I, too, would like to congratulate Dr. Liceaga and his Superior Board of Health of Mexico upon their most admirable work. The sanitary work

done in Cuba has been very well done and many of us look upon it with envy. I venture to say that there is not a city in the United States that has better drainage, better paving and a greater percentage of its houses connected with a sanitary sewer and good water than Vera Cruz. The whole city is paved and everyone is required to have sanitary connections. I hope you gentlemen caught one point there too, and that was the fact that not only the domiciliary visits were made but the closest espionage possible was kept of every non-immune that goes into the "hot lands" of Mexico. One fact that we learned is that no chain is stronger than its weakest link. The weakest link in that chain is the fact that all immunes that visit that land are lost sight of as soon as they get back to the City of Mexico, although it is only two days and eleven hours from suspicious territory until they get back to the city of San Antonio in Texas. So short a lapse of time will allow a person contracting yellow fever in the hot lands of Mexico to reach Texas. Well within the period of incubation, the disease develops later and infects our state. I think this chain of espionage should be continued on into the United States so that proper precautions can be taken if such person takes sick.

Section of Municipal Health Officers

A LIMITED OUTBREAK OF TYPHOID FEVER DUE TO A DOUBLE WATER SUPPLY.*

By ALEXANDER JOSEPH DOUGLAS, M. D.
Medical Health Officer, Winnipeg, Man.

Water-borne outbreaks of typhoid fever are so common that I am sure everybody here has had some personal experience with them, and if it were not for the fact that the outbreak I propose to set before you presents rather unusual features I would not venture to occupy your time.

In the month of October, 1908, typhoid fever began to make its appearance among the men working in the yards of the Canadian Pacific Railway Company in Winnipeg. These yards comprise an area of about 1,000 acres, contain many buildings, and a large number of men are employed therein.

Cases were reported on the following dates, viz.:

October	19th.....1	November	11th.....1
"	20th.....1	"	12th.....1
"	27th.....3	"	16th.....1
"	30th.....1	"	17th.....2
November	3rd.....1	"	18th.....3
"	6th.....3	"	19th.....1
"	9th.....2	"	21st.....1
"	10th.....3	"	30th.....1

The occurrence of these cases in the same vicinity at a time when the city as a whole was singularly free from typhoid pointed to a common origin. A very careful investigation was made into all the particulars surrounding each case, it was found that the affected individuals varied widely in habits, place of residence, and boarding place when away from the yards. In but two instances out of a total of 26 men were these similar. The only points possessed in common were that all worked in the C. P. R. Yards and during business hours drank the same water.

* Read before the Section of Municipal Health Officers of the American Public Health Association, at Richmond, October, 1909.

The C. P. R. Yards are furnished with two sets of water mains; one of there contains water from the domestic supply of the City, which, derived from a series of artesian wells driven in rock, is of great purity. The water from this source is used by the Company as a drinking supply for its employees and for filling the drinking water tanks of its coaches. The other set of mains carries water drawn from the Red River—a highly polluted stream—and pumped by the City High Pressure Station for fire purposes through a restricted area. This river water is utilized for filling locomotive and stationary boilers and is employed on account of being much softer than the domestic supply. The pipes carrying these two waters ramify extensively throughout the yards and the various buildings within them, and in some places are situated close together.

Samples of drinking water were systematically taken everywhere accessible, and on November 18th, after a great many samples had been tested with negative results, water was obtained from a certain drinking tap from which it was possible to obtain bacillus coli in every instance. This organism is never found in the domestic supply of Winnipeg but always is present in Red River water. The building from which the suspicious samples were obtained was one of the places where the two sets of pipes were close together, and a careful examination revealed that a connection existed between them. The man in charge of the building (a gasometer house) admitted that he had connected the two early in October in order that should the high pressure supply for any reason fail, an incident that had once occurred owing to a break down at the pumping station, he would be able to fill his boilers from the domestic mains without loss of time.

When the connection between the two systems was found the course of events was very evident. Domestic water is forced through the mains at a pressure of between 40 and 50 pounds per square inch, the high pressure river water at anything between 150 to 300 pounds. When these two waters met the river water forced the other back up its own mains and replaced it there for a considerable distance. Individuals using water from this line of pipe supposedly containing artesian well water were really drinking water from the Red River into which all

the sewage of Winnipeg is discharged. It is to be noted that, with one exception, the affected persons had never been near the gasometer house at all, they obtained their water at a considerable distance from it.

The existence of this connection was definitely established on November 19th, when it was at once abolished. Cases of typhoid continued to arise until November 30th which was the last.

In all 26 cases occurred with 3 deaths. I trust this brief paper will serve to illustrate the danger of a double water supply, one good and one bad, to any locality, especially when the mains come close together here and there throughout their course. Any irresponsible individual may work great harm by interfering with the arrangements of the pipes to suit his own ideas. In this case the accident happened contrary to the regulations of the Company and the City of Winnipeg. The man responsible received a very severe lesson, but after all no reprimand or punishment that it is possible to inflict in such a case can repair the damage done. The only safe way would appear to be to arrange the two supplies—if there must be two—in such a manner that it is impossible to effect a direct connection between them.

METHODS OF CONTROL OF COMMUNICABLE DISEASE BY BOARDS OF HEALTH, ESPECIALLY IN SMALL COMMUNITIES.*

By FRANCIS GEORGE CURTIS, M. D.,
Newton, Mass.

In the following pages an attempt will be made to indicate the manner in which Boards of Health may best accomplish the work of attempting the control of communicable disease, more especially in the smaller communities where the means are more or less limited and the work must be carried out by a small staff. In larger communities there are undoubtedly other problems, fully as important, which confront the health officer but these cannot be spoken of here, and I shall confine myself to those which have come under my personal observation and attempt to show what can be done to overcome them.

In looking over the field of work it is evident that the effort should be directed along two main lines, namely, first, what shall be done to lessen the liability of an outbreak, and second, what shall be done after the outbreak has occurred. It is hard to say which is the more important of the two lines of effort, perhaps they are equally important each in its own way, but the problem of prevention is probably the more difficult to carry out efficiently and for this reason will be considered first.

The first step in the direction of prevention comes in getting sufficient money to do proper work. Indeed, unless there happens to be an outbreak of communicable disease in progress at the time that the annual appropriations are granted, there always develops on the part of the City Fathers, to whom we must look for the approval of our estimates, a strong tendency to economize in the matter of the appropriation for the Health Department.

It is very difficult to make the average member of a city government realize the necessity of preventive work which is of value in educating the public to a proper knowledge of how

* Read before the Section of Municipal Health Officers of the American Public Health Association, at Richmond, October, 1909.

to live as opposed to the visible steps which are taken when an outbreak is in progress. In that phrase "educating the public" I believe, lies the secret of efficient work in the prevention of communicable disease and also, in getting sufficient means to do that work, and we must bend our efforts in that direction.

The day of concealment and mystery has passed and we are all agreed that a very important branch of the equipment of a health department is what, for want of a better name, may be called "the publicity bureau."

People must be taught what the health department is doing and why it is doing it, so that they may recognize its value and be willing to sustain its acts. The work of the publicity bureau is of course educational and should be directed along two main channels, namely, the education of the adult members of the community and which is fully as important, the education of the children in the public schools.

There are several ways available of attempting to accomplish the first of these, and perhaps the best is by publishing a regular monthly bulletin of information and simple articles on the best methods of avoiding disease. This method, while undoubtedly the best, is expensive and may be beyond the reach of many health boards but almost the same result may be reached by occasional letters dealing with similar subjects to the local daily or weekly papers. Almost every city of any pretension nowadays has its daily or weekly paper and the editor is always glad to publish free of charge such articles, so that where this plan is followed the only expense to the department is the wear and tear on the brain of the man who prepares the article.

One health department has established a correspondence bureau to which letters may be sent asking for information on any subject that can properly be treated by the department. The letters, with signatures omitted, are published in one of the papers of the town, together with the appropriate reply. In this way much information can be imparted not only to the writers of the letters but also to the other readers of the paper. This method seems to be a very valuable adjunct to articles dealing with general subjects.

In the writer's own city, people are urged to call up the office of the health board by telephone, or to visit the office personally and ask any questions they may wish, not only in regard to matters of general hygiene but also in regard to the action of the board in any specific case. While this method does not reach as large an audience as the ones just referred to, it has been found of value and hardly a day passes that one or more persons do not avail themselves of the opportunity. Indeed, during the last winter when over 50 per cent. of the children in a certain school were kept at home by their parents from an unfounded fear of scarlet fever, it was found that a few minutes' frank talk with a parent, explaining the measures which were being taken to check the outbreak, usually resulted in the return to school of the children of the person making the inquiry, showing that a lack of knowledge was at the bottom of much of the alarm.

In addition to being urged to ask questions as to the reasons for certain acts of the Board of Health and in regard to anything in relation to communicable disease, the general public is quietly encouraged to report to the office any suspicious circumstances which may be noticed. This gives the department a large number of persons who may at any time give valuable information, and that it is at times valuable is shown by the fact that within the past six months information of a suspected case of scarlet fever was received by the department, information which enabled the writer to pay a domiciliary visit and discover the existence of a concealed case of scarlet fever.

Another method by which this education of the public can be attempted is by the aid of the services of trained nurses. Even in cities where it is too expensive to employ trained nurses directly under the control of the Board of Health, there is usually a District Nursing Association or some similar organization, and an arrangement can be made by which the services of the nurses may be available for educational purposes. This can be done at very little extra expense to the department and will prove most valuable. The nurses reach a class of people who need instruction, and their advice and instruction will be heeded better than those of an official representative of the Board of Health, for it is the experience of the writer that the

Health Officer is, in many instances, looked upon as a sort of enemy, whereas the District Nurse, on the other hand, is considered as a friend, whose advice is to be heeded.

The affiliation of the health authorities with the District Nurses is of value in other ways also, such as the early detection of cases of communicable disease and other conditions detrimental to the public health. In such cases there is need of care on the part of the Health Officer when he makes his visit, for if the nurse is thought to be working as an inspector of the department she may lose her value as an instructor.

In the Medical Inspection of Schools we have another very valuable means of preventing an outbreak of communicable disease, although there is still room for improvement in the methods. In Massachusetts medical inspection is now compulsory, and some form is carried out in every community in the commonwealth. It is to be feared that as a rule, especially in the smaller municipalities the inspection is very perfunctory and consists chiefly in a brief visit by the inspector who inquires of the teacher if there are any children for him to examine. While this form of inspection is better than none at all it is far from what we should aim at, and it is to be hoped that it will become less frequent as time goes on.

In the writer's own city the inspection has been extended somewhat beyond the limits required by the statute and in the short time that the custom has been in existence it has proved to be very voluable and not more expensive than the old method.

Under this system each inspector has supervision over the public school children in his district, whether they are at school or not, and is required to know their condition as far as possible. It often happens that a child is absent from school for several days without any known cause, and often the rumor is passed about among the children that such and such a one is ill with some communicable disease. In either event it is the duty of the inspector to pay a visit to the home of any child who has been absent from school over forty-eight hours without known reason, and find out if he is ill. The result of the visit must be reported to the Board of Health, no matter whether the child is found well or ill. Of course such a system entails many visits when nothing dangerous is found, but if one child out of many

visited is found ill with communicable disease, it more than makes up for a large number of useless visits.

During the past year in two different instances children were found in the early stages of scarlet fever, and as the parents had no idea that the illness was at all serious and consequently had not called a physician, what might have been a sharp outbreak of scarlet fever was prevented. Occasionally the parents are inclined to resent the visit of the inspector, especially if there is no illness present, but a slight explanation usually soothes their ruffled feelings, and they are pleased to feel that such good watch is being kept over the children in the schools.

The Medical Inspectors of schools may also be used to instruct the children under their supervision in regard to general hygiene and more particularly in the best method of avoiding the danger of contracting communicable disease as far as possible. Instruction may be given by means of short talks to the children in simple non-technical language. Arrangements can be made with the school authorities to give these talks during the school session, or the use of a room may be granted for a lecture after school hours. The former method is of course to be preferred as a larger numerical attendance will be assured, and no valid objection can be raised that it interferes with the regular school work, because in many states instruction in hygiene is required by law and the lecture can be interpolated in place of the usual text book instruction.

The practicing physicians are a valuable adjunct of the Board of Health in preventing an outbreak of disease, and by making early reports of the occurrence of a case may give most valuable help. In Massachusetts every physician is required to report immediately in writing over his own signature each case of a disease dangerous to the public health which may occur in his practice. Physicians should be urged to supplement this report by telephone as in this way several hours and sometimes a whole day may be gained. Where the telephone is used it has often happened that the patient has been removed to the hospital, and all the routine work finished, many hours before the report is received. In this way a possible focus of infection is disposed of at the earliest possible moment and much valuable time saved. The telephonic report must not be permitted to

take the place of the written notification, as the latter may be of value in freeing the Board of Health from blame in case of a patient sent to the hospital on a misdiagnosis.

The relation between Boards of Health and the physician is a subject outside of the scope of this paper but the writer can truly say that in an experience of some fifteen years he has found his fellow physicians always ready and willing to assist the work of the Board of Health in any way possible, whether it be in urging the removal of a patient to the hospital or in giving voluntary aid when an emergency which taxed its resources confronted the Board, and it is his fixed opinion that the practicing physician may be considered as the outer line of defence against the attacks of communicable disease.

Even a laboratory for routine work can be established and maintained at comparatively little cost, for even if the expense is too great for one community an arrangement can probably be made to establish one, the expense of which may be shared between two or more neighboring municipalities. Should such a plan be impracticable, as a last resort some laboratory man can be found who will be glad to do the work of examining cultures, etc., when necessary, at a slight fee for each examination. This plan is better than relying on the assistance of the State Laboratory, for the returns can be received more quickly and the element of time is of value in such cases.

We come now to the question of dealing with communicable disease after it has broken out in the community and here we have to consider what shall be done with the patient himself, what shall be done with the other members of the family, and last, but by no means least, the discovery of the cause and its removal if possible. In considering the question of what shall be done with the patient the duty of the health department is merely to see that he does not become a source of danger to others. It is not within the scope of this paper to speak of specific cases but of the management of cases in general.

The first question is: "Shall the patient be taken to a hospital or isolated at home?" In ninety-nine cases out of a hundred the reply should be that he must be taken to a hospital, if possible. It is better for the patient himself and infinitely better for the public that this should be done. Almost all small

cities now have a hospital within their limits, and there is almost always an isolation hospital connected with it, and even when the city is not fortunate enough to have a hospital of its own, there is usually one within easy reach, and an arrangement can be made with it to take such cases. By removing the patient to an isolation hospital the annoyance of house quarantine is avoided, and the wage earners of the family may, in most cases, continue at work, thus avoiding a loss of income at the very time when the income is most necessary. Sending the patient to a hospital may even be less costly in actual dollars and cents to the city than keeping him at home, especially among the poorer members of the community. Often the mere suspicion of "contagious disease" in a family is sufficient to cause the wage earners to lose their positions, and if the family is not fortunate enough to have something laid by for a rainy day, the support of the whole family, instead of one member, may have to be borne by the city.

If there is no isolation hospital, or if for any reason it seems best to allow the patient to remain at home, the usual isolation of the sick person must be enforced.

The chief objection to isolation at home is found in the difficulty of knowing that the rules are properly carried out. It is here that the co-operation of the family physician is very valuable and must be relied upon chiefly, but it is well to supplement this by an occasional visit by the Health Officer.

When we come to the consideration of the proper treatment of the other members of the family the question presents more difficulties, the solution of which must depend somewhat upon circumstances. It is obviously impossible even if it were advisable to try to enforce a strict isolation, and the best that can be hoped is to evolve some plan which, while giving protection to the public, will allow a certain amount of liberty to the well members of the family. In almost every state the children of school age are excluded from school during the continuance of the disease, so that the decision does not rest with the local authorities. It is practically impossible to do much more than warn them to keep away from other children, and do our best to make them obey by frequent visits. This question is one

which requires careful consideration by heatlh boards in order that some good working rule may be formulated.

There is less trouble about the adults of the family; they can be trusted to keep watch of themselves and call for the advice of a physician if they begin to feel ill, and unless their occupation brings them in contact with children, or has to do with the handling of food stuffs, they may be allowed practical freedom of action.

The study of the cause of an outbreak of communicable disease is of the utmost importance and one which is too often neglected. Too many Boards of Health seem to consider that they have done all that is necessary when they have made a record of the case and put a warning placard on the houses where the cases occur. Such a course cannot be too strongly condemned, and each case should be carefully studied and compared with the others in order to discover the factors common to all and in that way find the cause. Isolation, disinfection and similar measures will avail little in checking an outbreak if there is some undiscovered cause at work spreading infection. It may be a case of "walking typhoid" among the employees of an outlying dairy farm; or it may be a child in the schools who has had a slight "stomach rash" which faded within twenty-four hours, that is causing the trouble, but whichever it is, all our efforts to check the outbreak will be useless until we have discovered and removed the cause. And furthermore we must not allow ourselves to be led astray by any preconceived notions of the cause of any given outbreak, but approach each one with an unbiased mind and study it carefully on its merits. We must not believe that because we have an outbreak of scarlet fever on our hands that the cause is due to an undiscovered case of scarlet fever among the school children. In one instance that came under the writer's observation there was a sudden outbreak of scarlet fever which seemed inexplicable, until finally the cause was found in a milkman employed on a dairy in a neighboring town. This man was desquamating after an attack of scarlet fever, and after his removal the outbreak ceased. One curious feature of this outbreak was that it picked out those members of the families who drank milk raw and spared those who used it boiled or pasteurized.

THE PREVENTION OF THE SPREAD OF CONTAGIOUS DISEASES, PARTICULARLY AMONG CHILDREN.*

By Dr. A. S. FELL,
Health Officer, Trenton, N. J.

The prevention of the spread of the contagious diseases that are ever with us to a greater or lesser extent, is one of the most important duties devolving upon all health authorities; one that has been widely discussed time and again and many measures adopted for the purpose of holding them in check. As we look the situation over as it presents itself to us day by day, we are impressed with the fact that there are certain factors ever entering into the question, which have a tendency to lessen the control over such diseases as all health authorities would like to exercise.

This paper must of necessity be brief and while we cannot hope to say anything that will be new on the subject, still if it should cause any discussion whatsoever, points may be brought out that will prove of very great benefit to us in our search for light as to the best means and methods to be adopted for the proper prosecution of the work in question.

Of the factors to be considered in connection with this question, one of the most important, is the risk entailed by perfectly healthy children coming in contact with a child who is in the prodromal stage of one of the acute contagious diseases such as scarlet fever, diphtheria, measles, etc. Authorities make the claim, and we believe with good reason, that this class of diseases are just as contagious during the prodromal stage as they are at any other period, therefore, if that be the case, the danger to other children during that particular stage is an ever present one and one that is hard to fight against, from the fact, as you all know that it is quite impossible at times to make an early and definite diagnosis. As a rule, children who are unwell, whether they do or do not present characteristic symptoms of any definite disease, are not isolated, but are permitted to continue mingling

* Read before the Section of Municipal Health Officers of the American Public Health Association, at Richmond, October, 1909.

with the other children in a household and also to continue at school until they are too sick to go about, or an alert teacher sends them home as a matter of precaution, not permitting them to return until they can present a certificate from their family physician that all is well.

While it is not impossible to isolate children when they first commence to complain of feeling unwell, on the principle that they may be in the prodromal stage of some contagious disease, it is rarely done, but it should be done always as a matter of precaution. If this were the rule rather than the exception, many children who now contract these diseases would almost surely escape them and the health and educational authorities would be saved much extra, unnecessary work and vexation of spirit.

Another factor we would speak of, is the known laxity of many physicians in reporting such cases promptly to the authorities. We realize as well as any one can, how almost impossible it is at times to make an early and positive diagnosis in these cases, but this does not excuse the fact, that it is the duty of every physician who is called in to see an ailing child, to isolate it immediately, unless he is in a position to make a positive diagnosis on his first visit, and then await further developments. As soon as the disease is recognized, it is the physicians duty to instruct the parents as to the precautions that should be adopted to prevent any further spread of the disease, either in their own or other households, and then immediately report the case to the health authorities, so that such steps may be taken as is necessary to checkmate the disease.

But aside from all this, some physicians fail to report these cases, even after they have made a positive diagnosis. Some do this wilfully. Some do it for fear of incurring the displeasure of certain families whom they may be particularly anxious to please; some do it because they claim, whether rightfully or wrongfully, that the law cannot compel them to do the slight work required in reporting a case, gratuitously. Some just simply fail to do it at all and without any good reason. They just neglect it.

Just here, in connection with this known laxity in reporting, we would like to quote, with your kind permission, just a

few lines from a report made last August on this subject by the Health Commissioner of Seattle, Washington, which appeals to us as being exceedingly apropos:

The Commissioner says: "Probably the most dangerous man in a community is the physician who fails to comply with the law requiring all infectious and contagious diseases to be immediately reported. This is especially true in regard to mild or suspected cases of contagious diseases which, when unreported, are extremely dangerous to the public health. Such a man, who will, knowingly, allow contagion to spread throughout the city, ought to be driven from our midst. A physician who has not the manhood to promptly report cases of this nature, on account of fear of offending a family, should have his name stricken from the roll of honorable men. A physician who knowingly allows the spread of contagion, in order that his pocketbook may fatten, deserves the most harsh treatment from the people to whom he may bring sickness or even death. We can readily understand how the ordinary layman, without an understanding of the nature of contagion or the necessity for quarantine, may feel aggrieved when the health department finds it necessary to quarantine his home for a certain length of time, but for the physician who is educated in these matters, and who is protected by the laws of the commonwealth, there is absolutely no excuse for not complying with the law."

All the commissioner says on this subject is true. All physicians do not attempt to ignore us. The great majority cooperate with us at all times and under all circumstances, but there are always some in each community who deserve to be brought to book for their persistent ignoring of laws that have been enacted for the benefit of the public health, and they should be made to realize, that they, as a matter of fact, instead of being above, are subordinate to the laws just the same as anybody else.

Another factor is that we must contend with the proverbial dislike entertained by the average parent against having his home placed under the restrictive measures which a close quarantine necessarily entails, and many times parents will adopt almost any means at their command to escape its provisions. Instead of co-operating with the health authorities

in their endeavors to control and stamp out these diseases, as all right thinking people should do of their own volition, they assume an antagonistic attitude, and this despite the campaign of education that has been waged so vigorously by the sanitary authorities in the journals and press of our land, particularly during the past decade, in the endeavor to get them to work in harmony with us. This educational effort is having its effect on the people. Slowly but surely and gaining ground each year, public sentiment is veering around to that point where each and every citizen will give the matter his hearty endorsement and support, and towards such an end we must constantly strive.

Failure by parents or others to completely isolate a case of contagious disease after it has been reported, is another factor we must contend with. When a house is placed under quarantine, that quarantine should be all that the word implies, but unfortunately, many health departments throughout the country have neither the force, equipment or financial resources that will enable them to maintain more than a merely nominal quarantine, and this must in most cases be only partially effective. When a house is under quarantine, in addition to the instructions issued by the family physician, we also instruct them as to what they must and must not do, giving them all the necessary information as to the precautions that must be exercised, and yet with all this, some of them fail to isolate the patient in a room far removed from all the other inmates of the house and in addition they permit all the others in the house to come in contact with the patient. The mother, who is generally the nurse, comes and goes from the sick-room as she pleases, attending to the other duties devolving upon her and without taking such precautions as she has been specifically directed to do. In some instances, like a very mild case of scarlet fever for example, the patient apparently fully recovers from the attack within a day or two after they have been stricken, the eruption rapidly disappears, and then instead of being kept isolated until the desquamation has made its appearance and run its course, patients are often permitted the freedom of their homes and perhaps the surrounding neighborhood, to the later sorrow of other people whose children are attacked by the disease, and yet people wonder why these contagious diseases keep on appearing. We of course

realize that this condition could only occur in those localities where a health department exercises what we have before mentioned as a merely nominal quarantine, either because of a don't care policy or else from lack of a necessary force and equipment to carry out a quarantine that would be wholly effective. In the latter case quarantine could readily be made all that the word implies.

Many children complain of not being well and yet present no definite or distinctive symptoms, in fact a layman probably wouldn't recognize them if they did, and these are the cases that are sent away to school under an impression by the parents, that the ailment is merely a temporary one brought about probably by some internal disturbance, which a dose of castor oil or nitre will clear up speedily. Many children we know are prone to complain to their parents that they are not well, simply as an excuse to stay away from school and we need not wonder that doting mothers are often deceived and insist upon an ailing child continuing at school on general principles. A day or two elapses and the child is too sick to get out of bed; the family physician is called hurriedly; pronounces the case one of scarlet fever, diphtheria, or some like contagious disease; the health department is notified; quarantine instituted, and the teacher receives a message over the telephone to the effect that the child is down with a contagious disease. The other children are immediately dismissed for the day and the room or rooms fumigated thoroughly. The teacher then breathes freely, thinking in many cases that all danger from the case is past, whereas many times such is far from being the case, the disease micro-organisms have already secured a foothold on new and fertile ground, and instead of the trouble being over, it has only just begun, all due to the parents lack of appreciation of the fact that possibly the child was developing some contagious disease and should have been kept at home and isolated from the very beginning on general principles. Possibly too much blame should not attach to the parents for such a condition. They cannot well be expected to recognize a contagious disease in the incipient stage, that is hard for anyone to do, but still we think it advisable to impress upon the lay mind at every opportunity, the necessity for exercising extreme caution always.

Of the many sources of infection with which we must contend, one of the most prolific to our minds are the schools, state, public, private and parochial. We believe that all health authorities agree that the schools are the main distributing stations for the contagious diseases peculiar to children. During the summer vacation period, this class of diseases drops to practically nothing, but just as soon as the schools reopen in the Fall, reports of these diseases commence to come into the health department and despite the activities of the health and educational authorities to stamp them out, they continue throughout the school year, showing merely periodical aggravations and declines as the weeks pass by.

One of the pressing needs of all municipalities, (many have it already), is a system of daily medical inspection of all school children, if we expect to be able to exercise any efficient control of the contagious disease situation. Trenton is only just waking up to this great need and her eyes are not yet fully open. Our Board of Health has tried several times in the past few years, by recommendation to the governing body of of the city, to secure such systematic inspection as we believe all live cities should have if they wish to keep abreast of the times. We believe this to be the basis for any work instituted, having for its object a betterment of existing conditions. We do not believe these acute contagious diseases can ever be wholly eliminated. They, like the poor, will be ever with us until the millenium arrives, but keeping them down to a minimum figure at all times we believe to be entirely feasible, providing proper measures are instituted and then faithfully and persistently carried out. School inspection is one of the great levers by which this may be brought about. It won't be long before such an inspection will be demanded as a right by citizens and when it does come, the wonder will be as to why it was not started long before.

The question of the control of the acute contagious diseases and the medical inspection of school children are so closely co-related, that it is almost impossible to write about the one without bringing in the other. This is our only excuse for touching upon the subject at all, and if you gentlemen will permit the digression for a few moments, we would like to state briefly, just

a few words on the school inspection in our city, so that if similar work in other cities is brought out at this meeting, we may be the better able to compare it.

For the first time in its history, medical inspection of public school children in the city of Trenton, was instituted on January first of this year. This service is one that has been recommended to the controlling municipal body, by the Board of Health, several times during the past few years. The question of whose control it should be under is of course a mooted one. In Trenton it is controlled entirely by the Board of Education, the Board of Health has absolutely nothing to say about it. The service as outlined and thus far carried out, we feel will prove inadequate to the needs of the city. It has already met with some criticism and even while this paper is being written, the Board of Education has the matter under consideration.

We now have a population closely approximating 100,000 people. There are thirty-one public schools with an attendance of about 12,000 children, aside from fourteen Catholic and numerous private schools which do not come under the provisions of this inspection. A comparatively small amount was appropriated to pay the expenses of the inspection during the current year. This being the first year of the work, it must of necessity be largely in the nature of an experiment, and probably too much should not be expected from it. Six young physicians were appointed to act as medical inspectors, at an annual salary of $200.00 each, and the public schools were divided between them as nearly equal as possible. They will each have in the neighborhood of 2,000 children under their supervision. These inspectors are young men on the very threshold of their medical careers. They are at work building up a private practice upon which they and their families must depend in the future. When this inspection was first started, it was the intention to have them devote the hours between nine and twelve each day to this work. These are the choicest hours of the day to a physician in general practice and we cannot blame these inspectors if they refused to give them up to this work. We believe this rule has been modified to such an extent, that the inspectors are only required to visit each school once a week and at other times to be under call. Under the first ruling, the work they were

asked to do was too great and the compensation allotted too small to warrant the giving of the time. Under the later ruling, we feel sure the service will prove to be unsatisfactory to both parties. As we have before stated, it is already being criticized. If the first ruling could have been carried out, the work would have been of incalcuable benefit to the health department in its efforts to control and prevent the spread of these acute contagious diseases, but as it is carried on at present, we feel it will not be of much benefit to us. Fortunately the corps of teachers in our public schools are ever on the alert for symptoms of illness however slight, among their charges and they do not hesitate an instant in excluding from school any child who appears to be in the slightest degree unwell, and furthermore, they are not permitted to return without presenting a certificate, either from their family physician or from the health officer. This constant watchfulness on the part of the teachers has helped us greatly in our work and we cannot commend them too highly for their endeavors to assist us at all times.

Our health department, like many others in this country at present, is badly handicapped in the prosecution of its work on contagious disease lines as it is on all other lines of work it is called upon to do, owing to the lack of a sufficient force of men, equipment and appropriation. In a city like ours, having a population of 100,000, the health officer should by all means be in such a position as would enable him to devote his whole time to the work, but the salary is insufficient and the tenure of office too uncertain to warrant his devoting more than a certain portion of each day's time to the work. The entire force for health work consists of the health office and two sanitary inspectors, the latter two being laymen, so that you can readily understand that to do all the work as outlined by the sanitary code, is a proposition that would tax the energies of more than three men. It is beyond the range of possibility to do the work as it really should be done, but we do the very best we can under the circumstances.

In the handling of contagious disease cases, aside from smallpox, we receive no assistance from the police department as they do in many cities in maintaining quarantine. The hiring of private guards is expensive, unsatisfactory and the appropria-

tion will not warrant it, hence we are compelled by necessity to exercise a merely nominal quarantine, consisting solely of placarding houses; instructing the inmates as to what precautions should be observed and finally when the patient is pronounced well, fumigate the premises.

What is necessary to keep the number of acute contagious diseases in a city down to the minimum at all times?

"A health department more than any other one department of a city government should be thoroughly equipped in every particular. It should not be hampered by an insufficient appropriation. Money should be a secondary consideration when a department is to be held responsible for the preservation of the public health. There should be an equipment and force large enough to cope with all the work there might be to do and do it right. All employees should be paid enough to warrant the devotion of their entire time to the work and the tenure of office should be made more secure. Under these conditions alone can the work be made satisfactory to all concerned."

"All cases of infectious and contagious disease, when reported, should be immediately investigated by the health officer or medical assistants and the cases should be under their daily supervision until the quarantine is removed."

"There should be a thorough system of medical inspection of all the school children in the city, state, public, private and parochial."

"All physicians failing to comply with the laws and ordinances of the Board of Health requiring the reporting of all infectious and contagious diseases and filing certificates with the Bureau of Vital Statistics should be prosecuted without fear or favor."

"The campaign along the line of educating the laity on sanitary matters should be prosecuted even more vigorously, if possible, in the future than has been done in the past, so that they may speedily be brought to a realization of the necessity for co-operating with us."

"Every city should have a thoroughly equipped municipal hospital. It should be open all the time and in charge of a competent staff of physicians and nurses, so that these cases could be removed without delay whenever necessary."

"Last, but far from being the least of the preventive measures, we should place forcible hospitalization. This we believe would prove to be the most important of the lot if it could be carried out in all cases of contagious disease, no matter what the character."

This last proposition would undoubtedly raise a storm of opposition in many quarters. Many parents would be unwilling to have their children or other near relatives removed to a municipal hospital, no matter how good the environment might be, but as a method of protecting the general public health it would prove to be invaluable. We follow this method with all of our cases of smallpox and seldom encounter any opposition, all due to the fact, that public sentiment has been educated to such a degree, that the patients and their relatives realize that it is the only proper thing to do. They appreciate the fact that to save their fellowman they must sacrifice themselves.

If this can be done with smallpox cases, why not with all cases of contagious disease? It is only a matter of education and we believe most people could be readily convinced of the necessity for it if it was presented in the proper light. There can be no question but that it would save untold suffering and needless expense.

PRELIMINARY REPORT ON THE TUBERCULIN TEST AS APPLIED TO A CITY'S MILK SUPPLY.*

By GEORGE W. GOLER, M. D.,
Rochester, N. Y.

The object of this paper is to present a simple plan for the examination of a city's milk supply to determine its measurable infection or freedom from infection with tubercle bacilli. Anderson, in the Journal of Infectious Diseases of March, 1908, shows the result of his work in the city of Washington, D. C., where in an examination of 223 samples of market milk, 15 samples or 6.72 per cent. contained tubercle bacilli in sufficient numbers to cause typical tuberculosis in guinea pigs after six weeks.

Hess† in New York, has submitted 107 specimens of the "loose milk" of stores to the physiological test, and found that 16% of his animals were infected by the tubercle bacillus. Read his paper, for he has given a most valuable resume of follow-up work in tracing the hygiene, sanitation, and tuberculous infection of the children of storekeepers who drank the milk, and became tuberculous.

The reason for determining the absence of tubercle bacilli from the market milk of cities is not altogether that the supply of market milk be drawn from herds free from the power of transmitting tuberculous infection to other cattle, and thus prolonging the lives of tuberculous herds; but that we may also be reasonably sure that the tubercle bacillus may not be carried to milk, and thus act as an infective agent in causing tuberculosis among our children. For whatever part we may take in the controversy concerning the infective power of the bacillus of bovine tuberculosis for men and women, we cannot cast aside the experimental proof of such observers as Schroeder, W. H. Park, Hess, whose work goes far toward proving that milk infected with the bovine type of the tubercle bacillus is a factor in causing tuberculosis in infants.

* Read before the Section on Municipal Health Officers, American Public Health Association at Richmond, Va., October, 1909.

† Hess. Tuberculosis in Milk, Journal American Med. Assn., Mar. 27, 1909.

W. H. Park shows as a result of 58 autopsies in infants dying of tuberculosis that in 20% the bovine type of the tubercle bacillus was recovered. It having been proven that the bovine type of the tubercle bacillus does cause disease and death in children, what are we as sanitarians to do in the matter? It is not sufficient that we devote our attention to establishing and conducting sanatoria, day and night camps, schools and classes, and preaching the doctrine of open air, rest and all the other means for the treatment of consumption that modern curative medicine has developed in the last few years; for we are dealing with a disease whose ravages are due to the stress of modern civilization. What does it matter even if we preach and work against city congestion, the bad sanitation of a city, induced by bad street car service, high street car fares, and the high rents which make city congestion possible in the tenement and in the block. We may talk and work against bad municipal housekeeping, smoke, dust, impure air and water, bad school hygiene, impure food, and all that goes to make municipal life less worth living, but if we still permit direct tuberculous infection to take place through the ingestion of infected milk, our work is done but in part. The municipality that permits milk infected with the tubercle bacillus to be fed to its children, does not provide that protection which it is bound to give them. It is not only that the city loses those who die, but it suffers through those whose resistance is sufficient to enable them to live, and thus become less efficient members of society. It is not the dead, but the half dead, who are a menace to society. The city that neglects to protect its children against milk infection with the tubercle bacillus aids the men who furnished this milk in continuing the life of infected herds and delays the day when the measurably infected herd shall be stamped out. For the dairyman who holds even one infected cow in his herd, not only maintains a cow whose life is a menace to the health of the municipality to whom he furnishes milk, but one whose milk producing capacity if not lowered immediately, is ultimately lowered because of her shortened life. The tuberculous cow is therefore a loss to her owner, and a menace to the health and lives of the children of the State.

This plan for determining the condition of the milk supply of a city is based upon the work of Anderson of Washington. It

differs only slightly in detail, and is so arranged that it may be carried out by even the smaller municipalities, or where men may not be obtained familiar with all the details of modern laboratory technique.

In our work samples are collected from the retailer in original packages and numbered serially. From a pint or quart bottle of milk, or when the retailer does not bottle his milk, a pint of milk is collected in a sterile bottle and taken to the laboratory. Fifty c. c. of milk is mixed with 50 c. c. of sterile distilled water, put in a conical glass and centrifuged for an hour at two thousand revolutions per minute. Our centrifuge has four arms, and thus four samples are worked up at the same time. Eight half grown pigs are used, two for each milk sample. The glass containing the sample of milk is taken from the centrifuge and a sterile platinum dish used to remove the layer of cream which is mixed with enough of the top milk to make it sufficiently fluid to pass through a good sized hypodermic needle. Five c. c. of the mixture is injected beneath the skin in the groin of one guinea pig; then all but 5 c. c. of the remainder of the milk is decanted from the glass, the sediment well stirred with a sterile platinum loop, and the 5 c. c. sediment mixture injected into the second pig. A similar procedure is carried out with the remaining animals, when they are charted according to color and markings and confined in open pens, four to eight in each pen. At the end of four weeks they are examined for enlarged inguinal glands and any other changes that may be present. At the end of six weeks they are killed, subjected to autopsy, and the macroscopical, but not the microscopical condition of the glands and viscera noted and recorded. Before working up the samples of milk each specimen is chemically examined and "counted," the animals dying of acute infection, amounting to 17% thus far, in our cases, are to be replaced by other animals subjected to like treatment from samples obtained from the same dealer.

When an animal is proven to have the well marked naked eye lesions of tuberculosis, as shown by autopsy, smears are made and the presence of the tubercle bacillus proven in this way. The name of the retail dealer from whom the milk was taken is obtained; he is asked to come to the Health Office, where the name of his producer or producers have already been taken from

the records. He is shown the animal and the lesions; and the manner of their production is explained to him, and he is told that one week will be given him to have the herds from which he obtains milk tuberculin tested; otherwise the milk will be excluded from the city. He is further told that he may go with the milk inspector, who will take the preserved viscera and show them to his producer. If the retailer agrees to go with the milk inspector to visit his producer, well and good; if not, the inspector goes alone to the producer, shows him the specimens from the infected guinea pigs and explains the necessity for having his herd tuberculin tested. If the producer agrees to have his herd tested, a form is given him from the State Department of Agriculture, which he is asked to sign. In New York State, the State Department of Agriculture agrees to test the herd, pay 80% of the appraised value of the animals that react and show localized lesions, 50% of the value of those with marked and more general infection. The test under the New York State law is made by a State veterinarian, and is without cost to the owner.

Since January, 1909, 50% of the retail dealers in Rochester have had their milk subjected to the physiological test by having guinea pigs injected with it. Out of eighty retailers whose milk has been tested, samples from five of them, selling approximately 2,000 quarts of milk from six producers having a hundred and eighty cows, have shown in the reacting animals marked naked eye evidences of tuberculosis. Of these producers, two, owning ten and fourteen cows respectively, refused the test, and the milk was excluded from the city. Four producers, owning one hundred and fifty-six cows, had their herds tested, and seventy of the cows reacted; twenty-seven of them had the disease disseminated, and their bodies were tanked for phosphate.

The City of Rochester has a population of more than 200,000 people. Approximately eighty thousand quarts of milk are used daily. On a rough physiological test of slightly less than half the market milk, 2,000 quarts, or 5% of the output is found infected, and this by using a test that depends only upon lesions that are apparent to the naked eye. If the microscopical lesions had been determined and used to exact the tuberculin test from the retailer and producer, or if the animals had been allowed to

live longer, or the infection of the guinea pigs had been determined by the injection of tuberculin as advised by Anderson, a much larger number of reacting animals, and therefore, more infected herds would have been found. But one of the important points in our application of this test in the preliminary work is that we present only naked eye evidences of tuberculosis to the retailer and to the producer that they can understand. Men engaged in the sale and production of milk are sufficiently well acquainted with the appearance of the viscera of animals in health to be able to note such marked departures from health as are shown in the bodies of guinea pigs when markedly affected by tuberculosis. The exhibition of such animals convinces the milkman every time. Microscopical evidences of the disease, no matter how plain to those conversant with laboratory technique, are not at present sufficient proof for the milk dealer or producer. When we have weeded out the markedly tuberculous animals from the herd that give early and naked eye evidences of tuberculosis, we may then attack the other end of the problem.

Another important point in this work as done by us is this: We hold the retailer responsible for the freedom of his milk from tubercular infection. If he buys milk that is infected, we give him a few days in which to see that his producer has his herd tested. If the herds are not tested, we exclude the milk from the city, and notify the Department of Agriculture. This is a simple plan by which any city may provide for the application of the tuberculin test to the cattle that supply it with milk.

Already as a result of this work notices have been sent to the State Department of Agriculture for the application of the tuberculin test to a number of herds which have not been shown to be tuberculous by our test. The farmer has been thus stimulated to apply for the tuberculin test himself. He sees the importance of saving his herd. We see the value of keeping our children from such tuberculous infection. How many cities will join in the work?

We have enlisted the aid of all people in the general campaign against tuberculosis. Shall the main work of this campaign be directed toward the building of sanatoria and other establishments for all manner of cases, for work with the disease, while the bad sanitation of city life, and the neglect of personal hygiene,

make the disease faster than all the institutions now provided or in course of erection can take care of it, or shall we as sanitarians direct the attention of men and women to the places at which the disease is in the making? If we are to accept the statements of Park and others, the bovine type of the tubercle bacillus is responsible for much tuberculosis, especially the glandular and abdominal types in the child. Shall we not do our mite in the campaign against tuberculosis by freeing from infection the herds that supply our cities with milk?

THE CLEAN MILK CAMPAIGN IN HAMILTON.*

By GERALDINE STEINMETZ,
From Data Supplied by Dr. James Roberts, M. O. H., Hamilton, Ont.

The initial step in Canada in securing a clean municipal milk supply was undertaken in Hamilton this summer. The point at which it began was the imperative necessity of having clean, fresh milk for bottle-fed infants during the summer months. This was secured, the expected results naturally following.

The previous state of the milk supply, as it is practically to-day in Hamilton and in all Canadian Municipalities, was controlled by a regulation regarding butter-fat and by a more or less thorough supervision of the stables, which prevented any extreme filthy conditions. Sterilization, that degree of cleanliness which is the only effective degree, was unknown in the premises of the milk-producers.

The credit for the idea and the inspiration for the clean milk campaign for babies in Hamilton, is due to Dr. Goler of Rochester. With his work in mind and his example closely to follow, the work in Hamilton was begun and maintained. Early in the spring, when the Rochester plant was not yet open, Dr. Goler personally explained his system of milk-control to a deputation from Hamilton which cannot sufficiently thank him for his courtesy and attention. Dr. Goler's unremitting efforts in Rochester are meeting with their due reward and recognition and Public Health Authorities all over the continent pay him the sincere compliment of imitation.

Any reform with regard to public health needs two supports; money and public opinion. As in most other places, the latter has to be created, and the former, always lacking, has to be begged.

When the project was proposed by the Medical Health Officer, Dr. James Roberts, to the Board of Health, it met with their heartiest approval, but the Board advised that the co-operation of the Medical Society of the city be obtained. This step, though necessary on account of the circumstances and lack of money,

* Read before the Section of Municipal Health Officers, American Public Health Association at Richmond, Va., October, 1909.

was not the most beneficial to the plan. One man can always control a new movement better than six. After passing by two meetings of the Society when the attendance did not justify its introduction, at the third meeting the subject was given a cold reception and formal endorsation. It was hoped that physicians would prescribe the pure milk and thus help to create a demand.

The Board of Health could not, from its small appropriation, allot the sum, $500.00, necessary to carry it through. The city council was appealed to. Ladies, interested in such reform work, took the matter up and convinced the council that it was a scheme which met with their approval. The result was a grant of $100.00.

Just here you will, perhaps, pardon a digression on the occasional (!) lack of correspondence between the amounts of annual city grants and the purposes to which they are put. Two volunteer regiments get $250.00 each; a poultry association $50! The Bowlers' Club $250.00! the Clean Milk for Babies, $100.00! Nor is this the only occasion upon which money imperatively needed for the protection of public health has been refused. In 1908 a by-law was passed for the issuing of debentures for a $75,000.00 isolation hospital for contagious diseases. But the officials whose duty it was to carry out the wishes of the citizens, instead of forwarding, prevented, by intrigue and wire pulling, the carrying out of the plan. The result has been that for lack of proper hospital accommodation an epidemic of scarlet fever, almost uncontrollable, has held sway for two years, and is only now dying out. $75,000.00 would hardly be a high enough value to place upon the life, health and work lost and the inconvenience suffered through this illegal proceeding.

To return to the milk question. The executive part of the work was left to a Milk Commission, composed of members from the Board of Health and the Medical Association. Taking in hand the $100.00 grant, they obtained the balance needed as a loan from a local bank at 4%, making themselves personally responsible for its payment if private subscription did not complete the amount needed.

The press of the city wrote the work into popular discussion and approval. Headlines displayed the fact that 100 infants had died in the summer of 1908, from intestinal diseases

originating, in all probability, from unclean milk. It was expected that the death rate would be cut in half. The Victorian Order of Nurses, a charitable organization, took charge of the two distributing depots in the city. Public opinion was educated up to the point where it was considered that milk, clean and fresh from the cow, was not a mere luxury but an absolute necessity for infants, and a most desirable thing for adults.

The producer, whose milk was contracted for by the Milk Commission, has always made a point of producing milk under clean conditions and selling it directly to the consumer. He owns fifty acres and a small herd a few miles from the city. Milk was to be supplied by him to the nurses at the farm at 6c a quart for 25 quarts per day, and 7c for any amount over the 25 quarts. After it had been properly diluted by them with sugar solution and bottled, the milk producer delivered it to the depots in the city. The milk was contracted for from July 21st to September 18th.

The following is a brief outline of the mode of operation, which is already familiar to those who have read Dr. Goler's pamphlets:—

The chief points to be observed to get clean milk are to have healthy cows, sterilized pails and bottles, a clean stable, clean methods of milking, and immediate cooling of the milk. The cows at this farm have been tuberculin-tested and are free from disease. After the pails and bottles are washed, they are sterilized by placing them in a large wooden box and subjecting them to live steam from a boiler for an hour.

The stable is whitewashed and has screened windows to keep out the flies. The door by which the cows enter is hung with canvas strips which brush the flies from the cows' backs. The floor is of concrete, well-drained and is kept perfectly clean.

The milkers wear loose, sterilized, white gowns over their ordinary clothes and wash their hands before milking. The cows' udders are also washed. A marked improvement on old fashioned milking methods is the covered pail. The ordinary open pail admits dust and germs from the air. Covered pails with openings at the top 4 inches in diameter are used and are covered with sterilized absorbent cotton between cheesecloth.

As soon as each pail is filled it is taken to a separate milk

room 100 feet from the barn and set on ice. This immediate removal from the stable and sudden chilling is very important. The low temperature prevents the growth of bacteria and must be maintained. To the milk intended for the babies is added a solution of sugar and water to make it more fit for their use. This is done by the nurses in the shacks erected for the purpose.

The shacks and equipment cost approximately $500.00. The salary and expenses for the nurses and their assistant, with additional charges, increased the total cost to about $1,000.00. Next year, after the experiences of this summer, the total cost to the city should only be about $500.00 if the Board of Health controls the expenditure.

The outcome of this work was the sale of 3,377 quarts of clean milk containing the sugar solution. Two hundred and seventy-three babies were fed on this milk.

The direct results were as follows: Of these 273 babies, 13 died, but of the thirteen, six were moribund at the start. The comparison of the death rate for 1908 and 1909 shows an encouraging decrease. The infant death rate in July, 1908 was 30, in July, 1909, 29; in August, 1908, was 67, in August, 1909, 49; in September, 1908, 55, in September, 1909, 37. The fact that there is not a 50% decrease in the death rate is not due to the fact that the premise was incorrect but to these facts:

1. That the summer was unduly trying.
2. That not all infants were fed on this milk.
3. That a longer period of time is needed before definite and proven statistical results can be obtained. The doctors who prescribed the clean milk are very gratified with the results in particular cases.

The indirect results are much greater. All over Ontario much interest has been taken in the movement and both periodical and daily press have given much space to the question of clean milk.

In Hamilton the interest aroused will be directed to the passing of regulations relating to the testing of cows for disease, sanitary methods of milking and the keeping and distribution of milk at a low temperature. A city of only 70,000, like Hamilton, is not too large for effective control of the milk supply and it is expected that persistent effort will attain the results desired.

Section on Vital Statistics

THE IMPORTANCE OF POPULATION VITAL STATISTICS AND THEIR TREATMENT ACTUARIALLY.

By MILES M. DAWSON, F. I. A., F. A. S.,
Consulting Actuary of Bureau of the Census.

It is perhaps unnecessary really to expatiate before the members of this Association upon the manifest advantages of correct vital statistics. The reduction of the death rates, as well as the maintenance of the living in a good state of health, is precisely the purpose and object of this Association, and it is obvious without discussion that statistics which do not mislead, but instead, correctly represent the conditions actually existing, are of the first importance, because in no other way is it possible to know whether the progressive improvement which is aimed at is being accomplished or not. This is not merely true, likewise, of the death rate as a whole, but also as to the deaths resulting from certain diseases or other causes.

The vital statistics which are usually supplied, as the result of the returns of deaths only, are, when compared with statistics of other communities, apt to be somewhat misleading. Thus, for instance, when ratios of the same to the estimated population of the city or other district are deduced, it may appear that there is a lower or higher death rate as compared with some other city or district. Yet the figures may be wholly misleading because the distribution of the population at the different ages is not the same. As a case in point, if one of these communities is constantly receiving a large number of additions to its population by immigration, and the other perhaps is losing by emigration, the first being a relatively new community, and the second an old and well settled community, there will be a great disproportion of persons in the higher ages, in the latter community. Among these, no matter how good the stock may be from the

* Read before the Section on Vital Statistics, American Public Health Association at Richmond, Va., October, 1909.

standpoint of vitality and no matter how healthy the district and how excellent the sanitation and the personal hygiene, the mortality will be high, and the ratio of the deaths to the total population will be greatly influenced thereby. In fact, the better the stock from the standpoint of vitality, and the more favorable the conditions from longevity, the more persons there will be at the higher ages, where the death rate is inevitably high, and, therefore, possibly, though not necessarily, the higher the general death rate.

Undoubtedly, information of the same type relating to the proportion of the total deaths due to particular diseases or other causes, is of greater value; but even in these regards it needs to be taken into account that the amount of improvement which is possible in the matter of longevity, is limited. It is possible to cause more people to attain old age, but it is not possible to extend very greatly the extreme duration of human life. In other words, if more thousands of people, for instance, are brought safely up to the age of 70, it merely means that so many more out of that generation must die, in the nature of things, within the succeeding thirty years. This affects not merely the general death rate, but also the rates for deaths due to various diseases and other causes. The diseases which carry off the old will in such a population appear in excess of the averages elsewhere, while the diseases which are peculiarly fatal to the young and the middle aged will appear in smaller ratios than elsewhere, as causes of death.

Thus, for instance, diseases of the circulation and of the kidneys must be expected to appear more frequently as causes of death in the general mortality returns when a larger proportion of the inhabitants escape being victims of disease or accident in youth and middle age and attain to old age.

The foregoing is presented, not with any notion that it is a complete or even a comprehensive statement, but merely in order that it may appear that vital statistics which do not distinguish as to the mortality at different ages are defective, as a reliable guide, either in determining the true death rates in a community or in determining whether there has been an improvement in the vitality conditions, on the whole. This has long been recognized by the actuarial profession and by

statisticians who have given the subject consideration; but the difficulties of assembling information which enable the facts clearly to appear concerning the mortality rates for different ages and concerning accounting for the deaths at the different ages according to cause, are exceedingly great.

The most important difficulty, of course, has been to obtain accurate or even reasonably accurate information concerning the deaths, exhibiting the occupation, the age and the cause of death. The various states and cities which have introduced and maintained an adequate system of registration have been grappling with this problem for many years. It cannot be said that they have been entirely successful but throughout a large part of the country, from the standpoint of population now embracing more than half of the entire country, there is now in use under proper regulations for its enforcement, a system of registration which, it is believed, is giving reasonably uniform and reliable results.

The question is now before this Association for consideration, I am informed, what changes in the standard form of registration certificate might at this time well be adopted. Before addressing myself to that topic, I am disposed to report the metrical form of death certificate, which is said to have been indulged in by a certain wag among the doctors:

> "Regarding William Shore
> We'll never see him more,
> For what he took for H_2O
> Was H_2SO_4."

That is, instead of water, sulphuric acid.

It is a far cry from the early state of registration to the present comparatively perfected form; but there is even now only too great a disposition in some quarters to feel toward it as this physician may conceivably have felt, viz.: that it is a great joke at best, and sometimes an imposition. In some parts of the country there are even members and sometimes very prominent members of the medical profession, I am told, who cannot bring themselves to see that it is only by holding the physicians and the undertakers strictly accountable, that the vital statistics of a community, city, state or nation can be made of real value and utility.

The present standard form, especially with the amendments which have already been suggested and canvassed, and particularly the amendment requiring the nature of the industry in which one is employed to be stated, as well as the nature of his employment therein, seems to be pretty nearly all that will be necessary to cause the vital statistics of registration districts which are now furnished constantly to the permanent bureau of the census, to be of the highest significance.

The sole item of additional information which I venture to suggest is that the question could be improved by changing the question "occupation" to "last occupation" or perhaps better "latest occupation," or it might be better to leave the questions as suggested by others, and add "if retired, state last occupation."

It is of particular importance that the precise nature of these questions be now determined and agreed upon after full discussion and consideration, because—and this is another phase of the matter which falls to me to discuss—it is not sufficient that we merely have the information which is afforded by the registration of deaths. We must also have information as to the number of lives exposed at the different ages and in the different occupations, and this information can be obtained only by enumerations, such as are undertaken in the census and one of which is to be undertaken early next year. It goes without saying that we cannot have a death-rate when we merely know how many have died. We must also know how many have been exposed to the risk of dying, for the death rate is found by dividing the number of deaths by the number who were so exposed.

Where it is possible, as in an analysis and investigation of the mortality statistics of life insurance companies, to follow each individual from the time he is admitted until the present time or until he ceases to be a member either by reason of death or discontinuance of his policy, the process furnishes the exposures for each age of life, and when the number of deaths at each age are divided by these exposures, we have a death-rate, exhibiting accurately the experience of the company.

Obviously, it is not possible, in connection with population statistics, to follow the individual lives thus closely. What is possible, however, may be illustrated as follows:

Suppose that an enumeration were taken of the population of a community, where the number is stable from year to year, on June 30th of a given year, and that this enumeration exhibited the number by sexes, occupations and ages. Suppose, also, that a correct registration were duly maintained. It is manifest that we would know in such case the average number of lives exposed during the year at each age, by sex, and occupation, and we would also know from the registration, the number of deaths during the year at each age by sex and occupation. It is also clear that if a registration of causes of death has been made that can be depended upon, we will also be able to account for the mortality by causes, and this in connection with every age, each sex and each occupation. This is fundamentally the method by which a correct computation of the population death rates must be made. Some modification of it may be necessary in various cases and indeed must be necessary, but this principle with only such modifications as are unavoidable, should be followed.

An important modification is one which will enable the mortality statistics of more than a single year to be utilized, even though the enumeration is only taken at decennial periods. One way in which, for instance, the mortality statistics of the year before the enumeration was taken, and the year after it is taken, may be utilized, is to treat the number of lives exposed for the three years as three times the number found by the enumeration, that is, to deal with the matter on the basis that the same number of lives were exposed the previous year and will be exposed the next year. This will be found to be approximately true, even though the population be increasing or diminishing, for the reason that the defect on one side merely compensates for the over-plus on the other, approximately.

Another important modification is by starting with the enumeration of a previous census, and by a system of what we actuaries call interpolation, arriving by a mathematical calculation at the approximate numbers exposed during each year of the decennium. In this manner we may add together the exposures for each of the ten years, and may then make use of the mortality statistics of a full period of ten years. It was by this method that the early mortality tables, published by the British govern-

ment in the course of its censuses, were constructed; and it is still employed, though the necessity for it is perhaps not so great in view of the greater reliability of the statistics which are nowadays collected, and the large number of exposures, both of which tend to make the mortality statistics of three years answer the purpose. An analysis, notwithstanding, of the mortality during each of the ten years previous, is frequently of great importance, particularly in reference to exhibiting what effect epidemics or unfavorable weather conditions may have had upon the death rates.

It is only during the last ten years that there has been a permanent bureau of the census, collecting mortality statistics and putting itself in position to furnish reliable and significant information. The twelfth census, that of 1900, could make but a limited use of this information, both because the registration areas were much smaller than at present and also because the statistics covered only a brief period. To this was added a further difficulty that the director of the census was required to have the completed results published by a certain date, which allowed altogether too short a period for a thorough analysis and presentation of the vital statistics to be completed.

The bureau of the census has during the last ten years assisted to bring about the adoption of a standard form of death registration, and, to a very large degree, of standard methods of enforcement of registration, as well as to extend the territory within which such registration is now required; and it has kept in close touch with all the means of registration, with the result that there is a large mass of reliable information as to the mortality in these districts arranged by sex, age, occupation and cause of death. It will, therefore, be possible to present statistics of the highest value and significance after the enumeration for the 13th census shall have been completed next year. The practical uses to which this information may be put are manifold. The first that will occur to physicians and all others who are interested in the public health is to encourage prevention and the early diagnosis and treatment of disease. Undoubtedly, there is a great incentive to improvement in this regard, both when the showing is bad and when the showing is good. For if it is bad, that means that it is not good as compared with some other

neighborhood or occupation, and this calls for efforts to improve the condition. On the other hand, if it is good this means that much has been accomplished in these respects, and that more may be accomplished if proper efforts are put forth.

As an illustration, the following may be noted: In the United States the statistics of the Inter-State Commerce Commission show the mortality among locomotive engineers and firemen, from the cause of accident alone, to be very much higher than the average mortality from all causes should be for men at their ages. While the death rate among employes of this class was never so high in Great Britain as in this country, it was very materially higher there than the general death rate for many years; but the last census of Great Britain showed that conditions had been so improved that the mortality among these employes was actually lower than the average for the general population, although the latter was also a great improvement as compared with the next previous census.

Another use of the material is to furnish reliable information to insurance companies and societies, thus enabling them to avoid either assuming risks at rates of premiums which will be ruinous to them, or charging extravagant rates of premium. They are most likely to make their premiums heavy whenever they are in ignorance. This is particularly true in connection with employers' liability insurance which is daily becoming more important, in view of the extension of the benefits under the employers' liability laws. Already, for instance, the idea of workmen's compensation, entitling the employe in event of disabling accident or his dependents in event of his death by accident, to recover from the employer, as a matter of course, if the accident happened while he was at work, has found lodgment on our continent, a statute of that nature having been adopted by the legislature of the province of Quebec, at its last session, to take effect on January 1st, 1910; and there are no less than four state committees or commissions now at work upon similar projects to be reported to the legislatures at their next sessions. Anything, therefore, which can be done in connection with the present census to supply employers with information which will prevent their being imposed upon in the matter of rates of premium and insurance companies and societies with information

which will enable them to fix such rates of premiums that they will be able to carry out their contracts, certainly should be welcome.

The life insurance companies of the country, also, are at the present time employed in extending the operation of their "specialized mortality investigation" beyond the experience which was tabulated some seven years ago, both with a view to bringing it down to date and testing it by comparison with more recent experience and also with a view to investigating other classes than those which were embraced in the original investigation. The work which has already been done in this regard has been exceedingly useful; but as was pointed out in the investigation itself, its significance is necessarily limited by the following fact, viz.: that for the most part, when these companies have accepted lives which are exposed to unusual hazard, they have exercised the greatest possible discrimination, selecting only the very best lives of the class. In consequence, it is not probable that these tables could be relied upon as exponents of the true mortality of the class. Knowledge of this fact, likewise, renders the companies peculiarly cautious about the acceptance of lives; and although the experience of the last seven years is doubtless broader, it is undeniable that if there were at hand reliable mortality statistics arranged according to sexes, occupations, ages and causes of diseases, there would be a disposition on the part of these companies to offer insurance at safe and moderate rates of premiums to all applicants of each of these classes.

There is also on foot at the present time an investigation of the mortality experience of fraternal beneficiary societies, and, while it will not be possible to get all of this arranged so as to exhibit the mortality according to occupation, it is expected that a large portion of it will be analyzed on that basis. There will be certain advantages in connection with this investigation, over the investigation of the experience of the regular companies, owing to the fact that some of the fraternal societies have been organized especially for the purpose of insuring persons who are engaged in comparatively hazardous occupations and frequently because insurance at reasonable rates of premiums could not be attained by them elsewhere. Moreover, many of the other fraternal societies have admitted persons who are engaged in occu-

pations deemed hazardous much more freely than the regular life insurance companies. Notwithstanding this, the information obtained by means of such an investigation, while highly valuable, will not have the same importance and significance as the results of a general mortality investigation conducted in connection with the census.

One reason why this is true of both the investigations last referred to, is that they will merely show the mortality among persons who were, when admitted, of a certain occupation, and will not, therefore, clearly and fully show the mortality of that occupation, because, unquestionably, many of them have gone into other employments long before their decease, and many of those who are still living are not in the original employment at all. It is important to the insurance companies to know how persons died who were at the time they were admitted engaged in a certain occupation, because, as a rule, neither the companies nor the societies provide that the insurance is to be void in event of change. But it is of yet greater importance even to them to know precisely what are the death rates to be expected in each occupation, as nearly as possible.

In all of the foregoing I have said nothing concerning mortality according to location. There is, unfortunately, no doubt that there are material differences between the rates of mortality in different portions of our common country; and this will to some extent, likewise, appear as the result of the investigations to which I have referred, but the showing will be defective, for the reason that the registration districts are confined to the northeastern states, to certain of the middle west states, and a very few of the far western states. Deductions concerning this matter which are made from imperfect data are, like other inferences of which mention has already been made, unreliable; and this is particularly true, when comparisons are made merely of the so-called death-rate. These comparisons would frequently be misleading, as has already been stated, even though the deaths had been registered and correctly reported, in view of the different distributions by ages. They are also rendered peculiarly unreliable when there is no such registration, or when the registration itself is so defective that it cannot be relied upon.

It is not necessary, I am sure, to make an appeal to the members of the American Public Health Association, to use their deservedly great influence in the various communities from which they come, to forward the cause of adequate registration. There is nothing which they could do that would better supplement their efforts to improve health conditions. They could thus point clearly to the evil consequences of neglect, and, when an improvement was made, they could promptly point to the benefits accruing. It should be possible, in view of the registration statistics of the last ten years and starting from the enumeration of 1900, after the enumeration of 1910 has been made, to estimate within a reasonable range of probability the exposures during the next decade, subject, of course, to necessary amendment after the enumeration of 1920 has in turn been made. In consequence, it should be possible to supply the leading registration districts such information as will enable those who are interested in the public health, to know from year to year what improvement is being made or, if the contrary should be true, to point out the lamentable consequences of negligence. Certainly no better use could be made of any portion of the valuable facts and deductions which will be supplied by the coming census and by the work of the Permanent Bureau of the Census, than this development of the Department of Vital Statistics

AMERICAN BIRTH REGISTRATION.*

By FRANKLIN C. GRAM, M. D.,
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Inasmuch as practically every community maintains some sort of birth registration, I shall take the necessity for it as granted. But however axiomatic the question under consideration may be, a certain amount of demonstration is required to arrive at proper conclusions. I shall not attempt to discuss the many sides this subject presents. Every Vital Statistician is familiar with them. My only object is to enunciate several questions which may form the basis for a free expression of opinion by men who are constantly in touch with the practical end.

I am frank to say that, after having completed sixteen years in the service as Registrar of Vital Statistics, I find the birth statistics end the most unsatisfactory part of my work. Whatever success I have achieved has been through a slow system of education, and I know also just how to account for the failures. Personal solicitation with those responsible for filing birth returns has accomplished much, when other methods failed, but no Registrar ought to be obliged to beg for that which the law requires to be performed and in which he has only an official interest.

The Registrar who prides himself in registering one hundred per cent of all births in his community must be endowed with that same elastic conscience which Speaker Reed possessed whenever he looked Heavenward and counted a quorum. Why this uncertainty with such important statistics? The State has an interest in the new born, but that interest is mostly statistical; the real interest comes with subsequent years. As a result, the birth of a child may escape the minds of those designated by law to record it, and this omission may not be discovered until such time later when this very evidence is required by the individual or the State.

* Read before the Section on Vital Statistics, American Public Health Association at Richmond, Va., October, 1909.

For the sake of argument, let us assume three hypotheses:

First. The importance of birth records, and what they should contain.

Second. Are American birth statistics complete?

Third. What methods should be adopted to bring them to a proper standard?

In answer to the first question, I want to cite the fact that a certain foreign element, which utterly disregards our laws and customs, persists in registering the birth of each child and immediately obtaining a certified copy of such record, so that when they and their children return, with the spoils of this country, to the land which they never foreswore, they may have documentary evidence that they were legally born—the mere fact that they exist not being considered sufficient. This custom is instilled, not by a process of education, but by stern necessity, and frequent application of the strong arm of the law.

In our own country this necessity is slowly becoming apparent everywhere, and it may safely be assumed that BIRTH STATISTICS WILL BECOME ACCURATE AND COMPLETE IN PROPORTION AS LEGAL NECESSITY FOR THEIR EXISTENCE MAKES THEM SO.

Several States have enacted Child Labor Laws, requiring children to attain a certain age and have other qualifications before being entitled to an employment certificate. The affidavit of a parent was originally considered sufficient evidence of a child's age, until it became a motive for perjury, it having been proven that eleven-year-old children would acquire fourteen years through the simple process of an affidavit. To remove the temptation for perjury, the laws of New York now require documentary evidence of the child's birth. This one act alone has done more to improve birth registration than anything thus far attempted. Parents, whose children are refused labor certificates because they cannot legally prove the date of birth, effectively advertise the fact among friends and relatives. As a result, all those interested look after their own registrations.

This is not the only principle involved. The entrance of a human being into the world is of as much importance as its exit. Why attach so much importance to the finish, and neglect the beginning? For various reasons, a community is as much entitled to a correct genealogy as the individual. The State is the

only avenue for an authoritative record which may be admitted as presumptive evidence.

And here I desire to digress sufficiently to touch upon a matter which has frequently caused me sad experiences. Let me state a case in point: A young man, intelligent, apparently of good stock, applies at the Registrar's office for a record of his birth. He states that in his infancy he was adopted by persons who do not know anything about his parents; he does not know whether he was an orphan and thus obtained foster parents, or whether his birth was illegitimate, and so became a ward of the State. His desire to know who he really is has grown with maturing years and he is probing every known avenue. In the case of a young woman about to be married, or already married, the incident is still more pathetic.

Of course, in the case of a waif found upon a door step, it would be impossible to trace its parentage. But door-step waifs are the exception. The rule is that the child was born in some maternity institution whose superintendent labors under a false impression that it is better for the future of the child to lose its identity, and, therefore keeps only such records as the law compels, and these records are usually falsified at least to the extent of assumed names. All maternity hospitals, whether public or private, should be under strict control of both State and local authorities; only legal adoptions should be permitted, the court keeping accurate records, accessible only to those directly interested; no baby farms should be tolerated anywhere—BABY FARMS ARE SIMPLY A STARVATION ROAD TO HEAVEN, the speed of travel depending upon the amount of money for which the parent can be bled; private adoptions should be prohibited, the mother not being as competent as the State to inquire into the moral and social conditions of the person to whom she entrusts her infant.

That these questions are important to every community can be certified by any registrar. What their bearing is relative to crime can be verified by criminal records. Only recently, the press reported that a certain vulture, in the guise of a woman, hovered around lying-in hospitals and offered to "adopt" the new born innocents for a money consideration. Within one month, she "adopted" a thousand dollars worth of infants who were as promptly murdered.

Do you agree with me that private adoptions should be prohibited? Do you also agree with me on the importance of birth records? Then let us consider what they should contain to render them valuable.

It requires no argument to convince anyone who has studied the subject, that the principal facts for records should be;

The GIVEN, as well as the SURNAME of the child; in case of twins, triplets, etc., THE ORDER OF BIRTH, as well as the name and sex of each, should be indicated, and ON SEPARATE CERTIFICATES; color; the exact date and place of birth; the name, nativity, age and occupation of the father; married name, maiden name, nativity and age of the mother; if illegitimate, that fact should be stated; number of mother's previous children; total number living at time of last birth record; date of record.

This, in brief, comprises all essential points, although some add the religious belief of the parents, which, from experience, I would personally approve. Still-births should NOT be included in the birth record.

Let us next consider the completeness of American Birth Registration. That our birth statistics are incomplete, even in our registration communities, must be granted. The ratio of incompleteness is variously estimated by different localities, but with our present methods I fail to see how anyone can make an accurate computation. The cause is likewise apparent. Even where the law compels registration, those having the enforcement thereof may not become aware of a birth until too late for prosecution. This neglect may not always be a wilful one. It may be due to oversight, forgetfulness, carelessness or indifference on the part of those required by law to make the original record.

Now as to the remedy. Undoubtedly every Registrar of Vital Statistics has, in the course of his experience, figured it out to his own satisfaction. Numerous remedies have been suggested, published, debated and legislated. They vary according to locality and conditions. Some suggest paying a fee to the physician or midwife for every birth certificate filed with the Registrar. This proposition has some merit and overcomes the objections of the overscrupulous who insist that the State cannot compel any service without compensation, despite the fact that

the highest courts of the land have ruled to the contrary. And where the system has been tried it has shown that even a nominal fee of twenty-five cents is a wonderful producer of birth records. But then, not all physicians are impecunious: some are affluent and would shun the implication. They show that they do not need the money by promptly forgetting all about it. These "better than the rest" physicians usually make the worst records. They are sure to omit most of the data called for on the blank, and are determined not to answer the remainder as they should be.

Others would place the Registrar under the fee system, thus making the amount of his compensation depend upon the fees for each registration. If the fee be paid by the municipality, then this plan also has merit—otherwise it is dead. "A long suffering public" is unwilling to pay for an imaginary imposition.

Then there is the plan of sending "reminders" to physicians at certain intervals, asking them to send in, for record, a certificate of every birth occurring in their practice during the intervening period.

These, and many other plans have certain merits, depending principally upon local conditions. In my opinion, however, we will eventually be obliged to follow European systems in this, as well as in many others which we have already adopted. Make it obligatory upon the parent to attend to the proper registration of every birth within a given time, and let this registration include the given name as well as the surname, and all data above enumerated, or which local conditions may require. Make it obligatory upon the parent to furnish a certified copy of this registration to school authorities, before a child can be admitted to school, and let this certificate accompany the transfer card as the child progresses in its scholastic course. In this event, every neglected registration would be discovered by the time a child is five or six years old, and proper remedies could be applied instead of allowing it to remain unregistered forever.

And lastly, whatever plan is adopted, give it moral and legal backing. Let it be a "live issue." The courts look after the dead, why neglect the living?

THE BUDAPEST SYSTEM OF DEATH CLASSIFICATION.*

By FREDERICK L. HOFFMAN,
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The Municipal Bureau of Statistics of the City of Budapest is by far one of the best of its kind and its publications command the respect and admiration of the scientific world. The methods of statistical tabulation and analysis of the Bureau were developed and perfected by the late Dr. Körösy and his able associates Dr. Thirring, the present director, and Dr. Julius J. Pikler, the vice-director of the Bureau. The publications are issued in the Hungarian and German languages. Annually a return is issued on the mortality of Budapest, and occasionally publications on special subjects, a recent number of which deals with the details of the Budapest system of death classification, a method of tabulation and analysis in important particulars superior to any other method yet devised to meet the peculiar difficulties arising out of the complex and variable nomenclature of diseases. The two essential departures from general practice in the Budapest system are: first, the manner in which the long established death classification has been adhered to, but made to correspond to the essentials of the Bertillon system; and second, the successful tabulation and classification of double causes of death, and of complicated causes, to which in general statistical practice no publicity is given in the published returns. I shall only deal with the second of these two improvements in statistical methods, and very briefly, as follows:

Every registration official is familiar with the difficulty of securing a correct classification of death certificates which contain more than a single cause of death. An elaborate system has been devised to overcome this difficulty, but every result is more or less impaired by unavoidable errors of judgment or the ignorance and often the mere caprice of the registrar. Nevertheless, much good has resulted from uniformity of action, but the Budapest system avoids the present difficulties by giving pub-

* Read before the Section on Vital Statistics, American Public Health Association at Richmond, Va., October, 1909.

licity to all the facts which are recorded on the death certificate. As observed by Dr. Cressy L. Wilbur in his observations on "Co-operative Methods for Improving the Usefulness of Statistical Classifications of Causes of Death," "For the treatment of jointly returned causes of death no systematic method applicable to all classes of returns has as yet been introduced. It is usual in statistical offices to keep a book of practice showing decisions in such cases, and in time precedents may be collected showing the assignments of the most common causes when returned together." A tabular arrangement has also been prepared by Dr. Bertillon, which, however, as pointed out by Dr. Wilbur, "deals only with the definite titles, not with the numerous terms of varying degrees of accuracy included under the titles, and the judgment of the statistician would often be required as to whether the relative assignments of certain titles should govern the assignments of certain terms included." This difficulty is overcome by the Budapest system, which, in the case of joint or double causes of death, assign first the determining or most important cause, which afterwards governs in the general classification, but which at the same time gives the required publicity to second or additional causes contributing directly to the death or which complicated the course of the disease. Under the present methods, for illustration, the death of a chronic drunkard due directly to consumption, but seriously complicated by chronic alcoholism, is recorded under consumption and the fact of the complicating cause is absolutely lost in the registered mortality. A death from typhoid fever complicated by valvular disease of the heart must, by the present method, be classified under one or the other of these terms, but the statement made by Dr. Wilbur that "The death can not be compiled under both typhoid fever and organic heart disease" is only correct as regards the present system of classification. The Budapest system easily overcomes this serious difficulty in a very simple but very effective manner, and the practical value of the system is illustrated by the fact that it has been in use for sixteen years.

In the Budapest mortality for 1907, out of 16,184 deaths from all causes, 1,756, or 10.8%, were deaths with complications, or in other words, deaths of which the official certificate or record

contained mention of more than one disease, complication or important collateral condition bearing upon the immediate cause of death. The percentages of joint or complicated cases vary materially, however, for the different causes, so much so that for certain causes the returns by the single classification are practically valueless—in fact, they are not only valueless but they are sometimes grossly misleading. This is best illustrated in the case of alcoholism, which, according to the single classification in Budapest, would be responsible for only 19 deaths, but according to the supplementary classification there were 87 deaths in which alcoholism was of more or less significance as a cause contributing directly to the death. In the case of rachitis, the single classification would have shown only 53 deaths, while there were 99 additional deaths in which rachitis was a complicating factor, resulting, therefore, in a total of 152 deaths. In so important a cause as peritonitis, by the single classification only 106 deaths would be returned, while the amplified classification would return 190 deaths in which peritonitis was either a direct or a contributory cause of mortality. In other words, in the case of alcoholism, 78.2% of the mortality with alcoholism as a complication would be unrecorded; in the case of rachitis, 65.1%; and in the case of peritonitis, 44.2%. For certain other diseases the percentages are less, but of very considerable significance and importance. In the case of bronchitis, by way of further illustration, 26.1% of the mortality would be unrecorded by this system of single classification; in pneumonia, 26.5%; in nephritis, 22.4%; and in degeneration of the heart, 23.6%.

These illustrations will suffice to emphasize the importance of the subject as one which should receive most careful and early consideration, so that as far as practicable the annual reports on the health of the nation and the states and municipalities may be correspondingly corrected to throw more light on the true factors of mortality. The fact, in other words, at the present time is that by a system of single death classification only one cause of death is recorded, while all the other contributory factors which may, and very often, have serious significance, remain unrecorded. Under the Budapest system the proportion of such unrecorded collateral factors may range from 10% to 80% of the particular diseases affected. It is evident that as long as this is

the case both general and preventive medicine must fall short of their highest degree of scientific perfection and public utility. Since the Budapest system has been in use for sixteen years the experience gained is not only very large but may be considered thoroughly representative for other countries. Under the Budapest system every important fact on the death certificate is considered in the final tabulation according to sex but without other elaboration in matters of detail.

Naturally, in all cases the determining cause of death, or the most important cause of death, is first indicated in the usual manner, and the cause is assigned its proper number under the general system of classification in the principal tables, and of such causes there are 83 in the Budapest system. When this is done every one of these causes is carefully gone over, and in the form of a special tabulation, the secondary or additional, or complicating causes are enumerated in the order of their sequence. This is of particular importance in the grouping of other or miscellaneous causes not specifically classified, such, for illustration, as "other infectious diseases" and "other constitutional diseases"; the latter, under the Budapest system, would be No. 31 of the general classification, but under the amplified classification it was found that 16 diseases had thus been classified, including 53 deaths from rachitis and 45 from chronic alcoholism; also one from mercurialism and two from trichinosis. One might easily be led to the conclusion, therefore, on examining merely the general returns, that no deaths from trichinosis or mercurialism had occurred in Budapest during the year under consideration. All these causes would be classified under the secondary or additional classification, as set forth in brief tabular form in the annual reports. Having thus been made a matter of record it is, of course, at any time comparatively easy to study the mortality in further detail from the original certificates if it is desired that this should be done. The classification serves also the very important purpose of correcting mistakes which are certain to occur under any system of death classification, however theoretically perfect, due to errors of judgment or lapse of memory on the part of the registrar. In the Budapest experience, including from 15,000 to 16,000 deaths per annum, it has been found that this supplementary classification requires about

eighty hours of work, or about two weeks, during the year. It is held that this additional working time is not really an additional expense but rather a corrective method and a check upon the accuracy of the original decisions and subsequent classification under single causes. It does away entirely with mere memory, or with serious errors of judgment, in the treatment of jointly returned causes of death. But whatever errors may be made in the decisions as to ultimate classification, they are, under the Budapest system, made a matter of public record, so that they can be subsequently verified, or changed, or allowed for, as the case may be. Under the system in general use such errors are completely hidden, and the tables have an appearance of scientific accuracy not actually inherent in the returns.

In the Budapest experience it has been found that supplementary classification is necessary in only about thirty causes of death, so that the technical difficulties of supplementary classification are not as serious as they might at first appear to be. It is held by the Budapest authorities that in part the necessary labor is but an amplification of the system of single classification in that it enlarges the grouping under other causes of death, which comprehends, according to the Budapest experience, about 15% of the total mortality. But however this grouping may be enlarged, it can not do away with the practical necessity of stating in amplification the additional causes of death more or less contributing to the mortality from the recorded causes under the system of single classification.

It is rather difficult to give a brief account of the office practice under the Budapest system since the full tabulation takes up some twenty pages of the text of the special report. There are three standard tables in use, the first stating the number of deaths, by sex, according to primary and secondary causes; the second, showing the tabulated complications of the primary causes; and the third, showing the assignment or final classification of secondary causes under the eighty-three leading causes and their respective subdivisions. This is the best possible translation which I am able to make of the German terms as used in the report, but the meaning is made more clear by the following explanations and specimen tables.

Selecting for the present purpose the mortality from peritonitis, which, according to the Budapest system is No. 66 of the standard classification, and according to the Bertillon system No. 34, there were classified under this table 134 deaths under this disease as a principal cause of death, and 72 additional cases in which peritonitis was a complication. The deaths from peritonitis itself are grouped under four sub-titles, that is, first, deaths from peritonitis not amplified; second, acute; third, chronic; and fourth, pelvic peritonitis specifically so returned in the death certificate. All of the facts are set forth in tabular form as follows:

TABLE I.

MORTALITY FROM PERITONITIS (1907).

(No. in Budapest System, 66)
(No. in Bertillon System, 34)

	Peritonitis as the Principal Cause		Peritonitis as a Secondary Cause		Total	
	M.	F.	M.	F.	M.	F.
Peritonitis, (n. s.).....	41	69	40	32	81	101
" acute.....	2	4	..	..	2	4
" chronic.....	1	..	..	..	1	..
" pelvic.....	..	1	..	..	..	1
Total.....	44	74	40	32	84	106

This table shows precisely how far peritonitis was really a factor in the mortality of Budapest during the year 1907, a factor not measured accurately by the single classification of deaths but only brought out in its true significance by the supplementary classification of secondary and complicating causes.

While according to the preceding table there were 118 deaths from peritonitis classified as such, with peritonitis as the principal cause of death, the question arises how far in these cases there were complicating factors not disclosed by the first statistical enumeration. These facts are brought out, therefore, in the following supplementary table:

TABLE II.

(No. in Budapest System, 66)
(No. in Bertillon System, 34)

DEATHS CLASSIFIED AS PERITONITIS AND COMPLICATING CAUSES.

	Males	Females
Peritonitis (n. s.)	38	68
" and pyaemia	1	1
" and arteriosclerosis	1	..
" and enteritis	1	..
" acute	2	4
" chronic	1	..
" pelvic	..	1
Total	44	74

According to this table, out of the 44 deaths of males from peritonitis, 38 were deaths not complicated by other causes, while six deaths were complicated by five other specified diseases or amplified by explanatory titles. The 74 deaths of females from peritonitis included 68 deaths from this disease not complicated by other diseases, 1 complicated by pyaemia, 4 specified as acute, and 1 as pelvic peritonitis. It is evident that the complicating causes were of less serious importance than the primary cause, and for this reason the deaths were properly classified as peritonitis in the first column of the first table.

In the second column of the first table there appear 72 deaths in which peritonitis was a complicating factor, but of lesser importance than the causes under which the deaths involving such complications were subsequently classified. The 72 deaths in which peritonitis was a complication were classified under 32 different causes, as set forth in detail in the following table:

TABLE III.

(No. in Budapest System, 66)
(No. in Bertillon System, 34)

DEATHS CLASSIFIED AS STATED WITH PERITONITIS AS A COMPLICATION.

Cause of Death Under Which Classified	Males	Females	Total
Scarlatina, nephritis	..	1	1
Influenza, pneumonia	..	1	1
Puerperal fever	..	1	1
Erysipelas	..	1	1
Lues acquisita, myelitis, (syphilis)	1	..	1
Tuberculosis, pulmonary	2	1	3
" intestinal	2	1	3
Cancer of stomach	1	1	2
" liver	..	1	1
" intestines	1	..	1
" kidney	..	1	1
Valv. disease of heart	..	1	1
Thrombosis	1	..	1
Ulcer of stomach	1	1	2
Hernia incarcerata	1	1	2
Appendicitis	9	7	16
Appendicitis, degeneratio myocardii	..	1	1
Ulcer of intestines	1	1	2
Fistula vesicorectalis	1	..	1
Polyposis recti	..	1	1
Cholelithiasis	1	..	1
Cholecystitis	..	2	2
Endometritis	..	2	2
Inflammation of uterus	..	2	2
Prolapsus uteri	..	1	1
Perimetritis purulenta	..	2	2
Oophoritis purulenta	..	1	1
Hypertrophia prostatae	1	..	1
Abscessus colli	1	..	1
Casus fortuitus	11	..	11
Homicide	4	..	4
Homicidium alcoholismus	1	..	1
Total	40	32	72

According to this table 16 of the deaths, for illustration, were from appendicitis, and on account of the greater importance of this disease as a determining cause of death, the cases are properly classified as appendicitis and not as peritonitis. It is

nevertheless, of importance to note that such complications occurred and the numerical extent of their occurrence is clearly brought out by this method of statistical analysis and by this method alone. Of course, many other illustrations could have been given to emphasize the practical value and importance of this method, but additional details would unduly enlarge the present discussion.

The office method of dealing with such double or complicated causes is to write additional cards or slips containing the essential particulars, which of course materially facilitates the handling of the data. The time required for this supplementary analysis has been made a matter of record and the additional expense incurred is not a matter of material importance. The author of the report is of the opinion that without this method of supplementary analysis the official mortality returns are materially impaired in their value and utility for scientific and general purposes. This conclusion is fully sustained by the experience of sixteen years and it has the sanction of perhaps the most qualified judgment on the subject. The adoption of this system by the Division of Vital Statistics of the U. S. Census, and the registrars of American states and cities, would very materially improve the scientific and general value of their reports.

TRADE MORTALITY STATISTICS.*

By FREDERICK L. HOFFMAN,
Statistician, The Prudential Ins. Co., Newark, N. J.

The substantial increase within recent years in the economic value of the working lifetime of persons employed in productive industries makes its conservation a matter of national and local concern, and the prevention of industrial diseases and accidents a governmental and individual duty. A large number of problems arise out of this conclusion, and their present-day importance is made evident by the increasing public consideration given to matters of employers' liability, workmen's compensation, labor protection, legislation, and insurance. As yet the basis of fact and information for such legislation and far-reaching projects for a state policy of labor protection is very indefinite and most of the conclusions as to a radical course in the present industrial system are not sustained by trustworthy statistical data subjected to a qualified statistical analysis. Curious as it may seem, it is the lamentable truth that not a single American state or municipality includes in its annual reports on the public health a thoroughly digested tabulation of the mortality by occupations, and while in some states, particularly Rhode Island, trade mortality statistics have been compiled for many years, the form in which the data are presented partly precludes their extended use for practical purposes and impairs their utility in connection with pending questions of social betterment.

It is hardly necessary for me to point out and discuss in detail the common faults of the statistical tabulation of occupation mortality data. It is sufficient to state that, almost without exception, the returns as given in most of the published reports have no practical value whatever except in a few of the registration states, for which they can be utilized if used with great caution. The essential and absolutely indispensable requirement is that the tabulation shall be by principal occupations according to age and cause of death, in conformity to the method adopted by the Board of Health of Sheffield, England, and the

* Read before the Section on Vital Statistics, American Public Health Association at Richmond, Va., October, 1909.

New Jersey State Board of Health, except that in the reports of this Board, by a curious omission the age at death of "all other causes" by occupation is not given, so that it is impossible to make practical use of the data at the present time. The Sheffield method has been fully explained by Mr. F. S. Crum in a paper published in the Quarterly Publications of the American Statistical Association for December, 1908.

The method simply requires that for each important occupation the deaths shall be classified in the usual manner, but by preference in the age grouping adopted for many years by the Registrar-General of England, that is, 15–19, 20–24, 25–34, 35–44, etc., but the classification by decades shall be continued to the end of life and not terminate, as is the case in the English statistics, with age 65 and over, for it is manifest that the effect of unhealthful trades can not be traced with accuracy into the later years of life unless the age distribution of deaths is given in sufficient detail. The classification by causes may be limited to a few essentials, particularly consumption and other tuberculous diseases separately, pneumonia and other respiratory diseases separately, liver diseases, lead and industrial poisoning, and accidents. For important industrial centers, where particular industries predominate, such as, for illustration, in the case of the pottery industry at East Liverpool and Trenton, or the textile industry at Fall River and New Bedford, the occupations should as far as possible be given in detail according to the chief branches of the industry rather than for the industry as a whole. To facilitate the tabulation and to economize in space most of the occupations classified under professional and personal service, clerical and mercantile, or employments generally understood to be free from health-injurious influences or particular occupation dangers, may be omitted. As an admirable illustration of how, under strict limitations, occupation vital statistics can be utilized to great practical advantage, mention may be made of the annual reports of the Board of Health of the city of Blackburn, England, in which for many years the mortality of textile operatives has been presented in a form which may serve as a model for simliar investigations in this country.

The standard death certificate as well as the general certificate in use throughout the country, almost invariably contains

the question as to the occupation of the decedent at the time of death. Evidently, however, the word occupation requires more exact definition since in many cases the industry engaged in is too broad a term to define the exact employment in which the decedent was engaged. I have frequently suggested to the proper authorities that the death certificate be modified so as to disclose accurately, first, the industry in which the deceased was engaged; and second, the actual occupation followed. The practical difficulty confronting the adoption of this suggestion lies in framing a very brief expression of both terms, which by long usage have become almost the equivalent of each other. But to return the occupation of a person only according to the industry in which he was engaged tends very often to disguise the most important factors in particular callings injurious to life and health.

To return, for illustration, the occupation of a person as a textile operative leads to no practical result when the object is to trace with accuracy the health-injurious effects of continuous employment in the different branches of cotton manufacture; for example, in the carding room or the weaving sheds. A correct classification would require that the certificate should state, first (in the case cited) that the decedent was employed in "cotton manufacture," and second, that his particular occupation was that of a carder, or a spinner, weaver, loom-fixer, general mechanic, etc. Only when this distinction is made can the data be utilized for really practical purposes in connection with pending investigations into the duration of normal trade life and the conditions and circumstances which more or less shorten it. With every advance in industrial medicine or the practical specialized consideration given to diseases particularly common in certain occupations or exclusively affecting certain industries, the necessity for a more precise classification and a more careful and extensive tabulation of occupation mortality becomes clearly apparent, and a board of health falls short of its greatest public usefulness by not including occupation mortality statistics properly classified and analyzed more or less according to the method referred to, in its annual reports on the public health.

Beginning with 1890 the decennial reports on mortality of the Federal census have contained an analysis of occupation mortality statistics for certain selected industries and occupations. The statistics are of some value but they require to be used with great caution. They can not as yet be compared in usefulness with the corresponding analysis of the occupation mortality of England and Wales, which has lately been enlarged to include the mortality of the retired according to the occupation which had been followed through the working lifetime. Since the English reports have become the standard authority on occupation mortality throughout the world it would seem best for American registrars to model their own reports and tabulations of occupation mortality data on the same line.

It is not necessary, however, in my opinion, and it will often prove inexpedient, to give full details for all occupations or for all causes of death. In the case of industrial centers particular employments may be selected and specialized according to the various and more important occupations followed. Too much discretion, however, is not advisable since quite often the most injurious employments are represented by but a small number of deaths each year, the value of which is cumulative and the returns of which warrant final conclusions only after a period of years. From the published occupation mortality statistics persons employed in professional and even personal service may, if necessary, be excluded, but city firemen and policemen should be included on account of the danger and exposure incident to their callings. In transportation and communication all of the employments should be included, but in mercantile undertakings many occupations may be excluded when lack of space precludes an adequate presentation of the facts. The principal consideration should be given to persons employed in manufacturing and industries generally, and perhaps it is best to include all occupations classified under these terms. The same conclusions hold true of building and construction, and finally of agriculture, fisheries, navigation, mining, quarrying, etc. For practical purposes it will be best to classify only the decedents aged 15 and over, and after summarizing the occupations specifically returned according to age and cause of death, the remainder should be grouped as "other occupied males," or as "other males," or if

the sex distinction is not made, as "other persons aged 15 and over," so that comparison may conveniently be made of the mortality in particular callings in particular communities, with the aggregate mortality of men and women, or persons employed in all occupations, or unemployed and retired, as the case may be.

The causes of death which require particular consideration are chiefly those which I have already mentioned. To these may be added, if space is available, typhoid fever, cancer, rheumatism, alcoholism, nervous diseases, circulatory diseases, digestive diseases, and urinary diseases considered as groups in the usual form. For all practical purposes, however, it will probably be sufficient to limit the number of occupations to be presented in detail in the report as well as the principal causes of death, but whatever selection is made one fact must not be overlooked and that is that the diseases not specifically classified must also finally be stated in a group according to the age at death and occupation, so that for each occupation a complete statement is available for the deaths from all causes according to age. When the classification is limited to say consumption and other tuberculous diseases separately, to pneumonia and other respiratory diseases separately, to liver diseases, lead and other industrial poisoning, and finally accidents, for present purposes at least, the most urgent need for definite and conclusive occupation mortality data will be met.

The question now arises as to the method by which occupation mortality is to be measured. The best method, of course, is to calculate the mortality on the basis of the population engaged in different trades. As a practical matter it will often be found next to impossible to do this. Unless a special occupation census is taken and repeated at regular intervals every few years, it will be a hopeless task to determine the number of persons engaged in particular callings as considered separate and distinct from the industry as a whole, not only with the required accuracy as to their number but with respect to their age and sex distributions. Of course, the decennial census or the state censuses at quinquennial periods are of great value and they permit of utilizing certain data for certain occupations and industries, but they very rarely apply to particular and localized problems. Another factor which impairs their value during intercensal

years is the rapid growth, particularly of industrial centers, or possibly, pro contra, their decay, due to sudden changes in industrial conditions, so that at best and at most the accurate calculation of mortality rates per thousand of persons employed, according to divisional periods of life and particular causes, is not only a very difficult task, but for many American industrial centers a practically hopeless undertaking.

To overcome this inherent difficulty I would suggest the use of a method which I have employed in numerous statistical investigations of this kind and as a rule to decided advantage. This method I have called "the proportionate mortality," since it clearly exhibits the true quantitative incidence of any particular cause of death at any selected divisional period of life. The method, in brief, consists in first separating the total number of deaths in any particular occupation according to divisional periods of life, and then the arrangement of the mortality in each group according to the principal causes of death. By adopting the mortality in all occupations, or in any selected group of exceptionally healthful occupations as a standard, a trustworthy comparison can be made of the specific incidence of any particular disease at any specified period of life. It is true, of course, that the resulting proportion on a percentage basis can not be utilized for insurance purposes in the calculation of premium rates, but the method, for sanitary purposes, furnishes with approximate accuracy a quantitative measure of mortality from particular causes, chiefly such as fall within the class of preventable diseases.

I may illustrate this method briefly as follows: Out of 1,590 printers dying during the period 1897–1906, in the experience of a representative industrial insurance company, 344 of the deaths from all causes were at ages 15–24, and of this number 167, or 48.5% were from consumption. The normally expected proportion of deaths from consumption at this period of life in the mortality of males in the registration area during the years 1900–1906 was only 27.8%, so that, as measured by this standard the mortality from consumption among printers was decidedly excessive. At ages 25–34 there were 439 deaths from all causes among printers, and of this number 247, or 56.3%, were from consumption. The corresponding percentage for males in the registration area, adopted for the present purpose as a standard,

was only 31.3%, so that as determined by this method the mortality of printers from consumption at this period of life was decidedly excessive. At ages 35–44 the percentage of deaths from consumption among printers was 40.5, and for males in the registration area 23.6; at ages 45–54 the percentages were 19.9 and 15.0; at ages 55–64 they were 9.2 and 8.1; and at ages 65 and over the percentages were 3.7 and 2.7, respectively. In other words, at every divisional period of life the proportion of deaths from consumption in the mortality from all causes was decidedly excessive among printers, as compared with the mortality of males in the registration area; but since the latter includes all occupations, a more rigid standard, limited to recognized healthful employments would have brought out a still more striking contrast. While the consumption mortality of printers was excessive at all ages, the excess was most pronounced at ages 25–34. By the use, therefore, of the proportionate mortality factor it is possible to arrive at definite and at least approximately accurate conclusions, which, on further investigation, will as a rule be sustained by the results of qualified inquiry into the actual and more or less health-injurious conditions under which many industries are carried on. This is particularly true of the mortality from consumption in dusty trades, and in nearly all such cases the evidence of the excessive proportionate mortality from consumption is confirmed by the conclusions of experts in industrial medicine.

The method of proportionate mortality analysis would, therefore, seem to be best adapted to the practical requirement of sanitary administration, and the most convenient for intelligent presentation in the annual reports on the public health. In selecting the standard of comparison it will probably be found that the normal average for the registration area as a whole will serve every practical purpose to emphasize the more or less health-injurious consequences of employment in certain trades as far as such consequences are traceable in the resulting mortality. While this method is not perfect it is nevertheless the best possible compromise between the practically unattainable and the present-day complete neglect of one of the most important problems of the time.

SMALLPOX IN THE UNITED STATES*

By JOHN W. TRASK, M. D.,
United States Public Health and Marine-Hospital Service.

GENERAL PREVALENCE.

Smallpox has appeared to be unusually prevalent in the United States during the last ten years. In several of the states the greatest number of cases was reported in the years 1902, 1903, and 1904. In 1902 Massachusetts reported 2,314 cases. In the same year New York State reported 450 deaths which in all probability represented at least 9,000 cases. During the year ending October 31, 1904, Pennsylvania had 5,172 known cases; in 1902 Michigan had 7,086; Ohio in 1903 had 6,903; Wisconsin during the year ended October 1, 1903 had 2,897 known cases. In 1904 Florida reported 973 cases and Indiana 6,185. During the year ended May 1, 1905, North Carolina had 7,375 and in 1907 Colorado with a total population of a little over half a million, had 1,119 known cases.

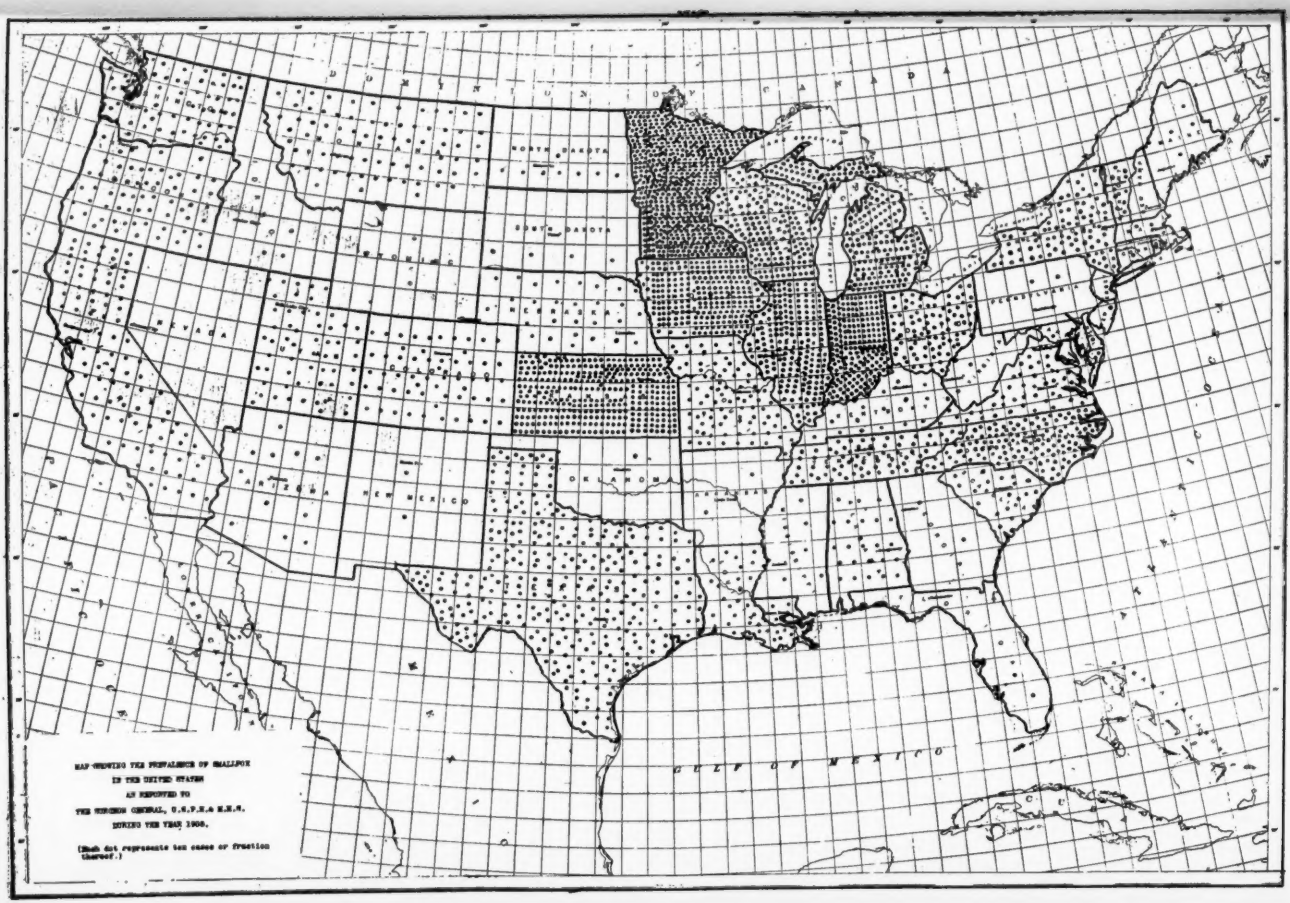
SMALLPOX IN 1908.

The number of cases of smallpox reported to the Surgeon-General of the Public Health and Marine-Hospital Service during the calendar year 1908, by the local and state health officers and registrars of the various states was as follows:

* Read before the Section on Vital Statistics, American Public Health Association at Richmond, Va., October, 1909.

State	Number of Cases	Number of Cases per 1,000,000 of Population*
Alabama	230	112
Arkansas	14	10
California	986	588
Colorado	571	909
Connecticut	4	4
Delaware	1	5
Florida	18	28
Georgia	3	1
Idaho	21	102
Illinois	2,067	374
Indiana	2,064	753
Iowa	2,488	1,131
Kansas	3,458	2,096
Kentucky	159	67
Louisiana	287	184
Maine	37	51
Maryland	11	8
Massachusetts	15	5
Michigan	2,091	804
Minnesota	7,031	3,397
Mississippi	44	25
Missouri	863	254
Montana	732	2,339
Nebraska	271	253
Nevada	0	0
New Hampshire	0	0
New Jersey	3	1
New York	846	101
North Carolina	1,256	604
North Dakota	78	159
Ohio	863	192
Oklahoma	7	5
Oregon	664	1,369
Pennsylvania	12	2
Rhode Island	1	2
South Carolina	175	119
South Dakota	26	55
Tennessee	676	307
Texas	3,161	873
Utah	575	1,780
Vermont	107	305
Virginia	396	199
Washington	596	946
West Virginia	8	7
Wisconsin	1,925	840
Wyoming	15	143
Dist. of Columbia	193	618
Arizona	110	764
New Mexico	15	69
Total	35,174	

* For this purpose the estimated population as published by the Bureau of the Census was used.


DOMINION OF CANADA
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
NEVADA
UTAH
COLORADO
NEW MEXICO
OKLAHOMA
TEXAS
GULF OF MEXICO
MAP SHOWING THE PREVALENCE OF SMALLPOX
IN THE UNITED STATES
AS REPORTED TO
THE SURGEON GENERAL, U.S.P.H.& M.H.S.
DURING THE YEAR 1900.
(Each dot represents ten cases or fraction thereof.)

DESCRIPTION OF MAPS.

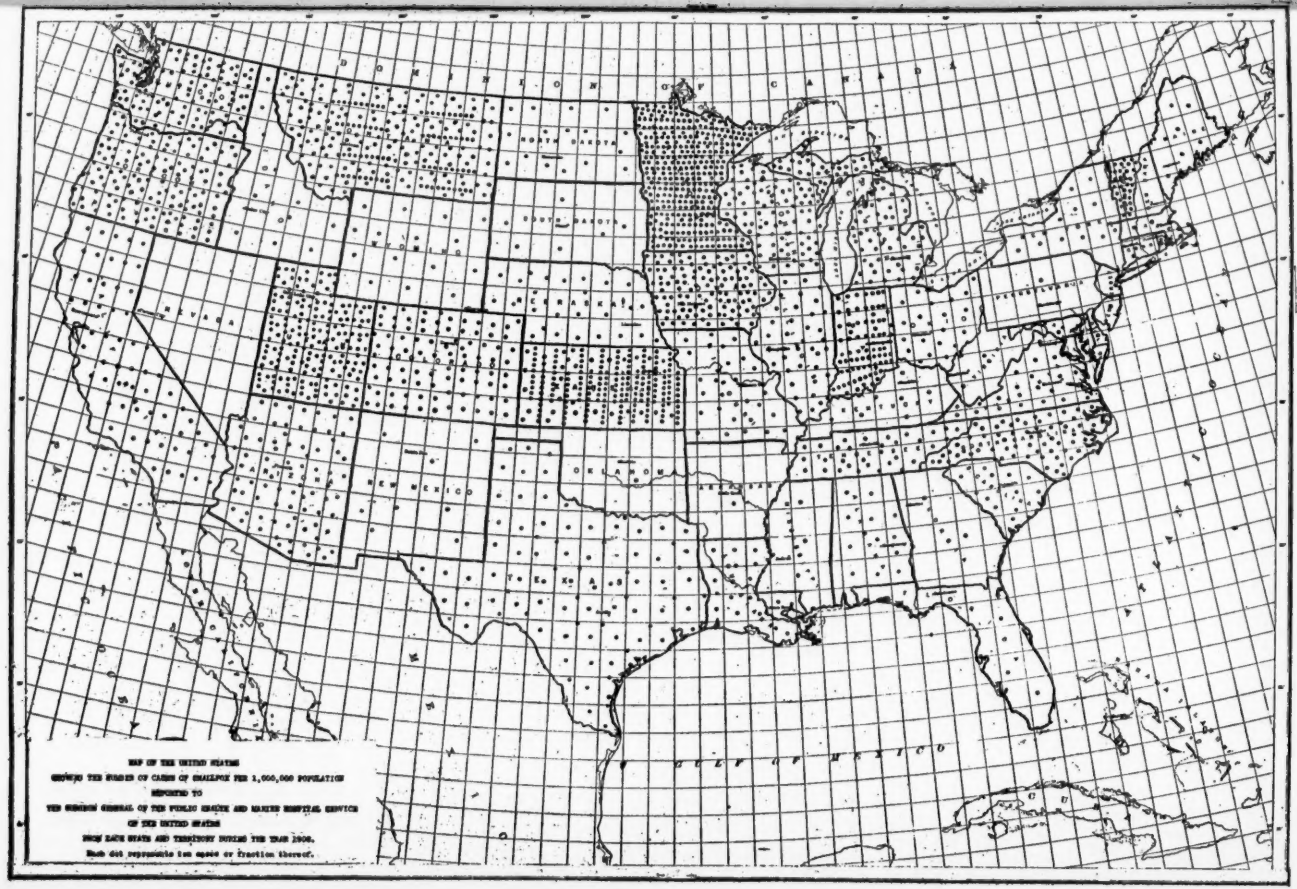
Map No. 1 shows the actual number of cases reported from each state and territory. Each dot represents ten cases or fraction of ten. It is not desired to convey the impression that the map shows the actual number of cases which occurred in all the states nor in each state, nor that it gives an accurate picture of the relative distribution of the disease. The map merely shows the number of cases of which the Public Health and Marine Hospital Service has been able to secure reports. It may therefore be considered as giving the number of cases of which there is official knowledge and which thus constitutes the known minimum. How many more cases there were which were not reported, or how small a percentage of the whole those here enumerated constitute, can only be conjectured. Some of the states which appear as having had but few cases undoubtedly had but little smallpox. Others appear to be comparatively free from the disease very probably because their cases were not reported or if reported were inaccessible for this compilation.

It is entirely possible that some of the states which appear to have had the greatest number of cases had no more and possibly even a less number than others which appear as having had much fewer cases of the disease. This might very readily be brought about by the fact that the disease was reported in some states and not in others. The states showing many cases can at least have the satisfaction of knowing that their smallpox cases have been reported and systematically recorded, and that thus having a knowledge of existing morbidity, they possess the essential factors for effective sanitary remedial measures.

In making the map no attempt has been made to group the cases according to the localities in which they occurred within the state.

The District of Columbia had 193 reported cases but owing to the small map area covered by the District, it was impossible to place the 20 dots which would represent them.

Due to the varying densities of population in the different states, the same relative incidence of the disease causes more dots to be placed in some states than in others where the relation of the cases to the population may be the same or even


DOMINION OF CANADA
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
NEVADA
COLORADO
KANSAS
NEW MEXICO
OKLAHOMA
TEXAS
GULF OF MEXICO
MAP OF THE UNITED STATES
SHOWING THE NUMBER OF CASES OF SMALLPOX PER 1,000,000 POPULATION
REPORTED TO
THE SURGEON GENERAL OF THE PUBLIC HEALTH AND MARINE HOSPITAL SERVICE
OF THE UNITED STATES
FROM EACH STATE AND TERRITORY DURING THE YEAR 1900.
Each dot represents ten cases or fraction thereof.

greater. To correct any erroneous impression which might thus be produced, map number 2 has been prepared showing the number of cases of smallpox reported for each 1,000,000 population. This gives a more correct idea of the relative prevalence.

As in map number 1, the area of the District of Columbia is not sufficiently large to allow of the plotting of cases. Figured on a basis of a population of 312,548 there were at the rate of 618 cases per 1,000,000 population in the District. This would be represented by 62 dots.

Minnesota had the greatest number of reported cases, there being 7,031, and also the greatest number per 1,000,000 population which was 3,397. Kansas with 3,458 was second in number of cases but third in rate per million, the second place in rate per million being taken by Montana which had 732 actual cases which was at the rate of 2,339 per million. Texas was third in number of cases and ninth in rate per million, Iowa fourth in number of cases and sixth in rate per million. Utah was fourth in rate per million.

MORBIDITY STATISTICS COLLECTED BY THE PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

The Public Health and Marine-Hospital Service first began collecting and publishing morbidity statistics in 1878. At this time plague was epidemic in Russia and yellow fever in the United States, and the Bulletins of the Public Health were issued weekly in accordance with the National Quarantine Act of April 29, 1878.

PUBLIC HEALTH REPORTS.

The Public Health Reports are now published weekly in accordance with the Act approved February 15, 1893, which reads in part as follows: "The Secretary of the Treasury shall also obtain, through all sources accessible, including state and municipal sanitary authorities throughout the United States, weekly reports of the sanitary condition of ports and places within the United States and shall prepare, publish and transmit to collectors of customs and to state and municipal health officers and other sanitarians, weekly abstracts of the consular sanitary reports and other pertinent information received by him and shall also, as far as he may be able, by means of the voluntary

co-operation of State and Municipal authorities, of public associations, and private persons, procure information relating to the climatic and other conditions affecting the public health."

The diseases to which greatest attention has been given in these publications are cholera, yellow fever, smallpox, leprosy and plague. It has been attempted in the Public Health Reports, and it is believed that the attempt has been highly successful, to give weekly a dependable record of the status of epidemics of the above named diseases both in the United States and abroad. The information given by this current record has been found to be essential for the efficient administration of the maritime quarantine and the reports are in daily use by the quarantine officers of foreign governments as well as our own. In times of epidemic in the United States the record of morbidity as shown by these reports, has been a first essential in determining upon the necessary suppressive measures and when and where to employ them.

COLLECTION OF STATISTICS.

The morbidity statistics collected in the United States are secured as follows: (1) Officers of the Public Health and Marine-Hospital Service report weekly by letter the number of cases and deaths from contagious diseases occurring in the cities in which they are stationed. In times of epidemic they report by telegraph as often as necessary. (2) Health officers and registrars of cities of 10,000 population and over report weekly on blanks prepared for the purpose. (3) The published bulletins of cities and state health authorities are received and used. (4) As an additional means of making the smallpox records more complete the bureau receives press clippings referring to this disease and whenever cases are noted at places from which reports are not received direct, a letter is written inclosing blanks for their report. The form which for some years has been supplied to health officers and upon which smallpox and other diseases have been reported is shown on page 140. A new blank which has just been prepared and which is now being sent out to replace the other one is shown on page 141. It will be noticed that in the new blank several diseases have been added. These are Pellagra, Leprosy, Hookworm Disease,

(*Old Form.*)

SANITARY REPORT—DOMESTIC.

Name of place.....

Date ....., 190

To the Honorable
THE SECRETARY OF THE TREASURY
(Bureau of Public Health and Marine-Hospital Service),
Washington, D. C.

SIR:

I have the honor to make the following Report of Contagious Diseases, and of the deaths which occurred therefrom, at this place during the week ended....., 190....

DISEASES	CASES	DEATHS	REMARKS
Plague			
Cholera, Asiatic			
Yellow Fever			
Smallpox			
Varioloid			
Varicella			
Typhus (or Ship) Fever			
Enteric (or Typhoid) Fever			
Scarlet Fever			
Diphtheria			
Measles			
Whooping Cough			
Tuberculosis			
TOTAL			

Total number of deaths from all causes reported during the week .....
Population according to census of....., 190 .....
Present officially estimated population..... .....
Prevailing diseases, and other pertinent information.....
.....
.....

Respectfully,

.....

.....

NOTE.—Please fill all blanks properly, and brief other side before transmittal.

(New Form.)

SANITARY REPORT—DOMESTIC.

Postoffice address.....
Date....., 190

To the Honorable
THE SECRETARY OF THE TREASURY,
(Bureau of Public Health and Marine-Hospital Service),
Washington, D. C.

SIR:

The following is a report of the number of cases of the diseases enumerated which occurred in the { city* / town* / county* } of.....
during the week ended Saturday,....., 19...

DISEASE	CASES	DEATHS	REMARKS
Pellagra			{ No. cases in institutions..... / No. cases not in institutions.....
Leprosy			{ No. cases in institutions..... / No. cases not in institutions.....
Hookworm disease			
Smallpox			
Varicella			
Tuberculosis			
Enteric (or typhoid) fever			
Scarlet fever			
Diphtheria			
Measles			
Whooping Cough			
Plague			
Cholera (Asiatic)			
Yellow Fever			
Typhus (or ship) fever			
Rabies—In man			
In animals			
Tetanus			

Total number of deaths from all causes reported during the week .....
Population according to census of 19...., ...
Present officially estimated population.....
Conditions affecting the Public Health.....
.....
....., Health Officer
for the { city* / town* / county* } of .....
State of.....

NOTE.—(a) Additional copies of this blank, and addressed envelopes for their return, will be furnished upon application to the Surgeon-General, Public Health and Marine-Hospital Service, Washington, D. C.

(b) You will confer a favor by placing the Surgeon-General, Public Health and Marine-Hospital Service, Washington D. C., on the mailing list for all bulletins and reports issued by your office.

* Cross out the two words which do not apply.

Rabies and Tetanus. It is appreciated that with the exception of leprosy these diseases are not ordinarily reportable, and that therefore, complete records will not be obtained. However, at the present time we have practically no statistics of these diseases and in the case of pellagra and hookworm disease, no reliable means of estimating their prevalence. It is believed that a partial record will be of far greater value than no record at all, and that these statistics will at least show the geographical distribution of the diseases in question if not the total number of cases. It is also believed that such statistics will be of the utmost value in indicating necessary sanitary measures.

It is recognized that the method of collecting these statistics of disease is not ideal, and that the results are not perfect, but it is believed that the method is perhaps as good and the compiled statistics as complete as can be made with the prevailing systems of registration.

In the collection of statistics of smallpox by the various methods employed, occasionally the same cases will be reported to the Bureau from different sources. To avoid duplication all reports are carefully checked. It would be much more satisfactory if it was not necessary to use these various means of collecting the statistics of smallpox and other diseases, but if instead all reports could be received direct from the state health authorities, as is now done from some states. Of course this method would be satisfactory only in those states in which records of morbidity were maintained and in which the state health authorities were willing and able to forward a transcript of their records at regular intervals. This cooperation is greatly to be desired. On it depends the satisfactory collection of morbidity statistics.

The Public Health Reports have for the most part been intended to show the current prevalence of contagious disease and have been prepared for immediate use rather than for an accurate record of cases and deaths which can only be obtained after some delay and are, therefore, useful mainly for purposes of comparison and study.

GENERAL PREVALENCE OF SMALLPOX.

Smallpox is undoubtedly more prevalent in the United States than it should be. Just how many cases are occurring it is impossible to say owing to the inaccessibility or absence of records. It remains to be seen whether the conditions which have existed for a decade and still exist are accidental and constitute an unusual prevalence of the disease due to unknown natural causes which will disappear in time causing the disease to subside.

If there were 35,174 cases in the United States in 1908, or even presuming that the number was twice this or over 70,000, which is undoubtedly more nearly correct and possibly still too low a figure, and presuming that only one-tenth of the people in the United States are unprotected by vaccination, a figure also undoubtedly too low, then the unprotected 8,000,000 or 9,000,000 could annually supply 70,000 victims indefinitely, so that we can hardly assume that the disease will necessarily exhaust itself, and even if it does there would seem to be nothing to prevent its constant reappearance.

The prevention of smallpox constitutes a public health problem generally believed to be fundamental if not elemental in character. So great a number of cases of what is believed to be one of the most easily prevented diseases in an enlightened community must necessarily put sanitarians and public health officials on their mettle.

All are familiar with how smallpox has been stamped out of the German army by systematic vaccination. There may be those who will say that it is much easier to eradicate this disease from an army where there is perfect control over all individuals than it is to accomplish the same result among civilians. This of course is to some extent true but in this connection it is worthy of note that some of our own states have practically eradicated smallpox from within their borders, and that the few cases which occur receive their infection from other states. What has been done in the Philippines is also of interest. The Director of Health of the Philippines in his annual report for the fiscal year 1907, states "During the year there has been unquestionably less smallpox in the Philippines than has been the case for a great many years previous. In the provinces of

Cavite, Batangas, Cebu, Bataan, La Union, Rizal, and La Laguna, where heretofore there have been more than 6,000 deaths annually from this one cause alone, it is most satisfactory to report that since the completion of the vaccination in the aforesaid provinces, more than a year ago, not a single death from smallpox has been reported. So thoroughly are the Philippines saturated with the contagion of smallpox that probably 25 per cent. of the residents would soon succumb to this disease if it were not for the ability to protect the inhabitants against it by vaccination."

VALUE OF MORBIDITY STATISTICS.

In the eradication of this disease, and the same is true of practically all others, the first essential is an accurate knowledge of its distribution and prevalence, a knowledge of the number of cases and where they are, in other words morbidity statistics. The states, therefore, which have appeared as having had a large number of cases do so because they have successfully recorded the cases and accomplished the first step in a successful campaign for the suppression of a disease. Other states have had few cases because they have gone one step further and successfully eradicated it. Still others appear to have had few cases, undoubtedly because they have not as yet started the campaign and have no reliable means of knowing the extent of the disease within their borders. It is to be expected that states where such conditions exist will undoubtedly harbor the disease for some time and be a constant source of infection to others.

Our chief and practically only aid in determining whether a disease is increasing or decreasing in frequency or remaining in statu quo is morbidity statistics. Without them we may form conclusions as to the prevalence of a disease by recourse to individual experience or general impressions, but these are usually inaccurate and certainly not to be depended upon. Mortality statistics are of service in determining the frequency of the diseases which have a uniformly high death rate. Unfortunately most of the diseases of greatest moment and interest to the health officer do not belong to this class. As an example of this may be cited the disease in question, smallpox, the death rate of which varies so markedly in different commu-

nities and in the same community during different epidemics. Broadly speaking all public health work depends on a knowledge of morbidity, for public health work is a fight against public morbidity.

The first step in a campaign against a disease should be to ascertain where it is and how prevalent. The health officer is greatly handicapped in his endeavors unless he possesses a knowledge of the existing morbidity of not only his own city or state but of that of his neighbors. A knowledge of morbidity gives to the health officer a basis for work, and to the community a knowledge of the need of sanitary measures. It must ever be largely true that the communities with the most exact knowledge of the prevalence of existing disease will be the ones to give their health officials the greatest moral support and to demand the most from them.

A community is usually reluctant to tax itself for the support of public health work unless it has a definite knowledge of its need.

The role played by morbidity statistics is at least twofold. First, they show the existence of diseases dangerous to the community, the need of immediate action, and where to act. In contagious diseases they reveal the foci of infection. Second, they serve for purposes of study and comparison, showing the efficiency or inefficiency of existing measures, and the need for others.

In conclusion it is desired to state that the completeness of the morbidity statistics collected by the Public Health and Marine-Hospital Service—and therefore their value—depends entirely upon the extent of the co-operation rendered by state and local health officers. Correlation of effort in this respect is necessary in order that accurate statistical information respecting smallpox and other diseases may be available.

INSANITY IN IMMIGRANTS.*

By P. H. BRYCE, M. A., M. D.,
Chief Medical Office, Interior, Ottawa, Canada.

The charge having been made in some quarters that there was an unduly large number of immigrants being admitted to Canada, who became subsequently or were at the time of admission insane, it became a duty to endeavor to determine as far as statistics were possible what the exact situation was.

For comparison, it was necessary that comparisons of populations be made as regards age periods, sex, nationality, etc., according to the last census. The population by age periods in the three countries was:

	England, Wales 1901		Canada 1901		United States 1900	
Under 15	32.4		34.0		34.4	
15 – 24	19.5		20.0		19.6	
25 – 34	16.1	47.8%	14.5	43.6%	15.9	47.6%
35 – 44	12.2		9.1		12.1	
45 – 44	8.9		11.5		8.4	
55 – 64	6.0	19.5%	8.2	25.3%	5.3	17.7%
65	4.6		5.6		4.0	

The notable differences at different age periods in Canada, especially as compared with either England or the United States, points to the fact that if a small population, as a Canadian Province or Eastern State, lost during a ten year period a notable number of its young population, or on the other hand had added to it an abnormal number, it must be apparent that the proportion of persons normally present in any age period would be notably altered. The first is the explanation of the excessive number of persons in the three later age periods in 1901 in Canada, which had for 20 years been losing to the United States a notable number of young men and women; while as will be seen in the figures for the three new Western Provinces, made

* Read before the Section on Vital Statistics, American Public Health Association at Richmond, Va., October, 1909.

up of a young population, the difference in the age periods in the 1906 census by an enormous immigration of nearly 100% over 1901, makes the variation from the normal even more marked. Thus:

Age Period	Canada		Manitoba Saskatchewan Alberta		Manitoba Saskatchewan Alberta	
	1901		1901		1906	
0 – 15	34.0		38.4		34.3	
15 – 24	20.0		19.2		21.4	
25 – 34	14.5	43.6	15.9	47.2	19.0	52.2
35 – 44	9.1		12.1		12.0	
45 – 54	11.5		7.0		7.3	
55 – 64	8.2	25.3	3.7	14.0	3.7	13.1
Over 65	5.6		2.3		2.0	

The causes of these differences are at once apparent if we note the number of children in an immigrant population. Taking the years 1905–6–7–8, it is found that of the 187,519 American immigrants to Western Canada there were of men 106,040, women 40,359, and children 41,090, or an average of 21.91% of children of 14 years and under, as compared with that in a normal population of 34%. This variation in the number of children is even more marked in the immigration from Europe, etc., to the United States, which was for 1904–1908 but 12.1% in a total of over 4,000,000.

Having these primary facts before me it became essential that in any study of insanity in a given population the number of immigrants in each age-period be carefully compared with its relative population, and as up to the end of 1908 the total immigration returns to Canada were available I attempted to study the effect of this immigration to the three North-West Provinces of Canada, whose population had increased by almost 150% between 1900 and December, 1908.

It was especially difficult to determine the true population of Canadians and Americans in these provinces, because a very notable proportion of the immigrants had been from Eastern Canada, and of those from the United States many were returned in the census of 1906 as "returned" Canadians, although in the immigration returns many of these were given as Americans.

Estimate had also to be made of the natural increase both in the population of 1901 and that of the immigrants of each successive year.

With the errors so far as possible eliminated in estimating population by nationalities, I was fortunate in being able to obtain a yearly return of the admissions into the several insane asylums from 1901 to 1908.

ADMISSIONS TO ASYLUMS IN MANITOBA, SASKATCHEWAN AND ALBERTA, 1900 - 1908.

	Total for 9 Years	Total of 1st 5 Years	Total of 2nd 4 Years
Canadian	759	353	397
English	353	146	207
Irish	80	29	51
Scotch	106	53	53
United States	149	42	107
Germany	56	23	33
France	53	24	29
British Possessions	13	4	9
Norway and Sweden	133	54	79
Austria	145	55	90
Russian	95	43	52
Italy	3	1	2
China and Japan	6	1	5
Unknown	31	4	27
Total	1982	840	1142

Comparing the admissions at the end of 1900 with those at the end of December, 1908, the fact is found that in one of the two asylums 40% of those present in 1900 were still inmates in 1908, and in the other 61%, indicating not only the probably young age at which such were admitted, but how without any per 1,000 increase of insane, asylums do rapidly fill up. That is, with a total of 407 in the asylums in 1900 there were, including those, to the end of 1908, 1,982 admissions; but with a population increased by 150% in 1908 as compared with that in 1900, the admissions were 358 as compared with 142 or estimated per thousand population the admissions in 1908 were .335, while those admitted in 1901 were .339 per 1,000.

It is of importance as regards the number of immigrant insane that the Canadians in the population of 1901 were 62% of the

total population and in 1908 but 54%. If a larger group be taken, as the first five years compared with the latter four years, which, with a population of just 1-7 more persons had 1,142 admissions as compared with 840 or with 961 if the population be made of the same ratio, it appears that there is a slight increase; but it will be observed that the movement of a portion of the 38% of the total population from below the 15 year age period to that between 15 and 24, which was 8% of the total admissions in any year, and of those between 50 and 60 to the period beyond that, will fairly account for this increase. If we turn to the rate per 1,000 of admissions of different nationalities for the nine years and reduce them to an average for one year we obtain the following:

Nationality	Population	Admission per 1,000 to N. W. Asylums average of 9 years reduced to one year
Canadians	461,229	0.19
British Islands	185,401	0.32
British Possessions (total 1,533)	1,533	0.94
United States	218,347	0.076
Germany and Holland	18,132	0.34
France, Belgium and Switzerland	28,711	0.52
Austro-Hungary, Galicia, etc	85,091	0.18
Russia and Finland	47,206	0.22
Italy and Spain	2,134	0.16
China and Japan	1,464	0.45
Others	1,497	2.30

What is worthy of remark in those tables is the relatively low rate of native Canadians and of Americans; but it must be remembered that of the latter probably a larger percentage are of Americanized Germans, Scandinavians and their families than of the old Anglo-Saxon stock.

However, it has been remarked by others as well as by myself that the Teutonic peoples, both German and Scandinavian, have in America a relatively high number of insane. What further is equally notable is that the Slav races, whether native Russians or Galicians, Poles, etc., have year in and year out a remarkably low percentage of insane, and the same may be said especially of the Italians.

Another rather remarkable fact is shown by the tables, viz., that of 1,982 admissions to these asylums, 1,274 were men and 708 were women. Compared with the ratio per capita, it is found that while males to females in the population were:

Census	Males	Females
1901	54.6%	45.4%
1906	57.6%	42.4%

The ratio of admissions was:

1901	64%	36%
1906	66%	34%

The idea that life on the wide western prairies is especially fatal to the healthy mentality of women seems absolutely without foundation, and is, I trust, permanently exploded.

To make our tables yet more valuable I may give the ratio per 1,000 of admissions to the asylums of these Provinces: Averaged to a rate per 1,000 population for one year

Age-periods	Ratio per 1,000 population at each age period
15 – 24	0.11
25 – 34	0.52
35 – 44	0.66
45 – 54	0.72
55 – 64	0.70
65 and over	1.05

The comparison of the percentage of admissions as compared with the percentage of population for the same period to the total is of much interest: For 1901–1906 the admissions between 25 and 44 were 58% of the total compared with 44.2% for the same period in English asylums. For the period over 44, the percentage is 33% of the total as compared with 39.8 for English asylums. If we take the population percentage for the same age period 25–44 we find in the Northwest Provinces it was 31% of the total as compared with 28.3 in England.

What however, is very remarkable is that while in the Northwest Provinces the percentage of admissions between 15–24 was but 7% of the total, while the population was 21.4 of the total in 1906, the admissions in England were 13.4%, although the population was but 19.4% of the total over 15 years. It would appear that the mental breakdowns in England were

greater in the early period of life, and thus would reduce somewhat the number of insane in later periods.

In the period between 25 and 44 the figures for New York State show a similar rate to that of England. Assuming the great difference to be real and not accidental is it to be explained by the great difference due to the high proportion urban to rural population in the two latter cases? These comparisons have an important bearing upon the total insane in any population, since while a high percentage, if under 15 years, tends to lessen the total admissions over a low percentage of population in this period and a relatively high population in the years beyond 45 years tends to increase the total admissions, yet it is the population in the years 25–45 of stress, wage-earning and child-bearing, which tells most directly in the total admissions.

As we have already seen the percentage of the total population in England between 25–44 was nearly 5% greater than in Canada in 1901, but is almost exactly the same as in the United States in 1900. Hence it will be of interest to compare the rate per 1,000 of admissions in the three countries.

The following table taking New York State figures is illustrative:

	N. W. Canadian Provinces 1900 to 1908 (average)	England 1902 to 1908 (average)	New York State 1904
Under 15	....	0.03	0.006
15 – 24	0.11	0.46	0.7
25 – 34	0.52	0.93	1.2
35 – 44	0.66	1.22	1.49
45 – 54	0.72	1.37	1.80
55 – 64	0.70	1.36	2.00
65 and over	1.05	1.53	2.80
Unknown age	....	....	6.00

Owing to the age-periods from which the figures of 1901 Census for all Canada are given they are not exactly comparable with the above; but the total insane was 3.07 per 1,000.

Accepting the figures for England as a standard we find that 0.5 or one in 2,000 population were admitted in a year to asylums there. If the population for New York be taken for 1900 as a divisor then the admissions taking these for 1904 were 0.91 per 1,000 annually, but if we take the population increase of New

York Cities for the 4 years as it was, at 10% then we may reduce this to 0.80 per 1,000.

The admissions for the Northwest Provinces with their 150% increase, chiefly through immigration, reduced to an average, give 0.27 per 1,000 or about one-third those of New York and one-half those of England.

To illustrate how much care must be taken in comparisons the following table is given of the official insane in different countries:

Country	Year	No. per 1,000 in Asylums	Class of Included
England	1903	3.40	All notified lunatics.
Scotland	1903	3.63	All in asylums, prisons, etc.
Ireland	1903	4.90	Does not include those in private houses.
Canada	1901	2.38	All present during census year.
France	1904	1.77	Inmates of all institutions.
Germany	1903	1.91	Inmates of all asylums.
Norway	1902	0.80	Inmates of all asylums 2.35 by enumeration.
Sweden	1903	0.97	1.54 official insane notified.
Denmark	1901	1.40	1.71 official insane.
New York State	1903	3.39	All inmates of asylums at a fixed date
Massachusetts	1903	2.88	All inmates of asylums at a fixed date
Michigan	1903	2.15	All inmates of asylums at a fixed date
Wisconsin	1903	2.47	All inmates of asylums at a fixed date
Minnesota	1903	2.13	All inmates of asylums at a fixed date
Austria	1901	0.51	In asylums.
Italy	1899	1.09	In asylums.

How inadequately expressed is the exact situation as judged by these figures may be judged by the fact that in those western states, Wisconsin and Minnesota, where the foreign population in 1900 was 60%, chiefly Teutonic, and a young population the asylum admissions are greater than in Germany, three times as great as Norway and Sweden; while they are four times greater than in Austria, and twice that of Italy.

It will be recalled that in the Canadian West the Teutonic immigrants admitted to asylums per 1,000, averaged for Germans 0.34, Norway and Sweden and Denmark, 0.52, so that it is plain that the clearest distinction must be made in comparisons, between the official insane, and the insane by census enumeration. Further, it must not be forgotten that it is only the 15–24

year age period, of all ages prior to 25 in which insane are found, so that an immigrant population with its relatively low child population will always show higher in the rate per 1,000 of population than it normally should.

How hospital and asylum accommodation is the chiefest factor in increasing the asylum population is seen in different states. Thus, from 1880 to 1903, the ratio of increase of insane in the asylums of New York was 62.5%; Wisconsin, 35.9%; Minnesota, 66.5%. The latter, however, was relatively lower to start with in 1880, the rate being 1.46 as compared with 2.76 in 1903. The comparative study must, however, be much further refined if we wish accurate information. Thus the statistics of the Metropolitan Asylums of London for 1907 are most instructive. Patients admitted were: 5,285 (but if corrected for transfers from one asylum to another is 3,554). This made an actual decrease of 43 over 1906. Of the attacks in 1907:

1,512 were first attacks of less than 3 months' duration.
417 were more than 3 and less than 12 months' duration.
651 were not first attacks of less than 12 months' duration.
46 were less than 12, but not known if first attacks.
522 were more than 12 months' duration.
278 were of unknown duration.
126 had congenital signs of insanity.
6 not insane.

The percentage of first attacks to total admissions in 1907 was 55.3%.

In pursuing my investigations into the asylums themselves in Canada I found that the transfers and repeated admissions of the same person, as is seen in London practically precluded the use of the year by year admissions as a basis of accurate comparison. But apart from this the problem especially in the older provinces was complicated by the fact that the place of birth if outside Canada caused the insane person to be registered as foreign-born, and he was often classed as an immigrant without the fact being mentioned that he was admitted perhaps as a senile dement of 70 years and had been 50 years in the country.

Again in certain of the asylum districts into which for Departmental purposes Ontario is divided, the population is largely rural and has had between 1900 and 1908 few immigrants. In

such it was found that the native born Canadian in 1905–1908 gave a higher percentage of admissions than in 1901–1904, or 90% in the latter as compared with 77.7% in the former in the Brockville district. Superficial examination would lead us to the conclusion that the native-born Canadians were becoming increasingly insane; whereas, the fact really is that year by year the old settlers, foreign-born, are dying off and the native born is yearly increasing in the population. The same was shown in the French-Canadian population in the asylums of Quebec. The fact is that a study of the insane in the foreign-born in America is only of any value where it is taken as we have done in Manitoba and studied it by age-periods. This was especially seen in Ontario where there are eight asylum districts and comparisons of admissions to each of these by ages was made. For instance, the Toronto district which probably receives 50% of the annual immigration to the province, as New York City does, was compared with the old-settled Brockville district. The admissions in Toronto per 1,000 were higher in the youngest population period and in the oldest in Brockville than in any of the other districts. But while Toronto had nearly 50% more per 1,000 population for the age period 15–24 than Brockville, the latter had actually four times as many admissions per 1,000 for the period over 65 years as Toronto.

What is further of great interest is that the Northwest Provinces with a population increase in eight years of 150% mostly by immigration as compared with that to Ontario of but one-tenth of the population had but slightly more insane in the 15–44 age period than in 1900, this being that to which immigrants almost wholly belong.

The total admissions to Ontario asylums in 1907 over 1905 was but 47, while outside of Toronto there was, in five asylums, an actual decrease of 31 admissions. As a matter of fact there seemed but one province, that of British Columbia, where during the four-year period of 1904–1908 the increase in admissions to the asylum of English born immigrants seemed disproportionate to the total of immigrants who are known to have entered the province.

But the subject is one of extreme importance, and the existence and enforcement of immigration laws are alone likely to prevent the ingress of persons who are undesirable aliens.

The Massachusetts Association of Boards of Health

JANUARY QUARTERLY (and ANNUAL) MEETING
Boston, Massachusetts

The quarterly (and annual) meeting of the Massachusetts Association of Boards of Health was held at the Brunswick Hotel, Boston, on Thursday, January 27, the President, Dr. Henry P. Walcott, presiding. Dr. Wood, Dr. Tobey and Dr. Chapin were appointed a committee to nominate officers for the ensuing year. The following persons were elected to membership:

Dr. M. H. Bailey, of Cambridge;

Dr. Henry C. Luce, of the Marion Board of Health;

Dr. Henry L. Dearing, of the Braintree Board of Health;

Herbert E. Bowman, Inspector of Milk, Somerville;

Dr. T. W. Murphy, of the Lawrence Board of Health;

Michael J. Coughlin, of the Fall River Board of Health;

Dr. David Townsend, of the Boston Consumptives' Hospital, Mattapan;

Dr. M. J. Rosenau, of the Harvard Medical School;

Miss Ida M. Cannon, Head of Social Service Work, Massachusetts General Hospital, Boston;

Dr. F. A. Sullivan, of the Haverhill Board of Health;

Dr. Frederick H. Thompson, Sr., of the Fitchburg Board of Health;

Dr. Josiah O. Tilton, of Lexington;

Dr. Nelson C. Davis, of Dorchester.

The Treasurer's report for the year follows:

REPORT OF TREASURER FOR 1909.

RECEIPTS.

Balance from 1908	$1,464.37
Received Annual Dues for 1908	48.00
Received Annual Dues for 1909	553.00
Interest Central Savings Bank, Lowell	53.04
Total Receipts	$2,118.41

EXPENSES.

Printing for Secretary and Treasurer	$ 27.50
Postage	48.52
Cigars and Dinners for Guests	42.72
Clerical Assistance	29.25
Treasurer's Bond	4.00
Stenographic Report of Meetings	128.34
Journal	313.00
Legal Expenses	20.00
Committee Expenses, mostly Printing	121.40
Total Expenses	$ 734.73
Balance to 1910	1,383.68
	$2,118.41

Of this balance, $1,366.53 is drawing interest in the Central Savings Bank, Lowell.

Respectfully submitted,

JAMES B. FIELD, Treasurer.

Examined and approved as correctly cast and properly vouched for. J. ARTHUR GAGE, Auditor.

Jan. 24, 1910.

Dr. FIELD. The most unfavorable feature of the Treasurer's Report is that our annual dues have failed to pay our current expenses by $133.73, and we have had to draw upon our surplus for that amount. This is largely due to the printing done by various committees. The expenses exceeded dues in 1907 by $31.61, in 1908 by $118.32, and in 1909 by $133.73. If we increase expenses in this ratio, in five years we cannot pay our bills.

The Association has completed its 20th year. Seven of its original members are still borne on the rolls: The President, First Vice-President, Secretary, and Treasurer, also Mr. Cosden of Boston, Dr. Croston of Haverhill, and Dr. Gage of Lowell.

Eighty-three members paid dues the first year, 301 members paid dues the 20th year.

The struggling JOURNAL of our early years has become a financial and journalistic success, while the Association has tremendously broadened its work and usefulness.

The report of the Treasurer was received and placed on file.

The Committee on Milk Legislation, which was asked at a previous meeting to draw up a set of model regulations for general adoption by the Boards of Health of cities and towns throughout the state, presented the following report:

Report of the Committee on Milk Legislation.

1. No person, firm or corporation shall engage in the production, sale, delivery or distribution of milk in the city of ..... (or town of.....), except in accordance with the provisions of the Revised Laws of Massachusetts, and of acts of the legislature additional thereto or in amendment thereof, and in compliance with the following rules and regulations of the Board of Health of said city.

2. Every person, firm or corporation producing, keeping or offering for sale milk in the city of ..... (or town of .....), shall annually, before the first day of June, be licensed so to do by the milk inspector of said city.

3. No milk shall be produced, kept, sold or offered for sale in the city of ..... (or town of .....), from any cow or cows that are not properly cared for or that have not, within one year, been examined by competent authority and certified to be free from all diseases dangerous to the public health; or that are kept in a stable that is not in a clean, healthful and sanitary condition and that is not open to inspection by the Board of Health or the Milk Inspector at all times.

4. No milk shall be produced, kept, sold or offered for sale in the city of ..... (or town of .....), unless it has been strained, mixed and cooled immediately after it is drawn from the cow; said milk shall not be strained, mixed or cooled in any room which is not provided with tight walls and floor or such construction as will allow easy and thorough cleaning or which is not kept constantly clean, or which is occpuied by horses, cows, or other animals, or in any room which is used in whole or in part for domestic or sleeping purposes unless the storage room for milk is separated from the other parts of the building and provision made for the exclusion of outside dust and flies to the satisfaction of the Board of Health.

5. Milk kept for sale in any shop, restaurant, market, bakery or other establishment shall be stored in a covered cooler box or refrigerator. No vessel containing milk for sale shall be allowed to stand outside of said cooler box or refrigerator except while a sale of said milk is being made. Every such cooler box or

refrigerator shall be properly drained, cleansed and cared for, and shall be kept tightly closed except during such intervals as are necessary for the introduction of milk or ice, and shall be kept only in such locations as shall be approved by the Board of Health.

6. The Milk Inspector shall under the direction of this Board, investigate and take samples to determine the quality of the milk sold, offered or exposed for sale or intended for sale in this city, and he shall make or cause to be made examinations and inspections thereof to ascertain whether or not adulterated or impure milk is sold, kept, offered or exposed for sale or intended for sale in said city contrary to the Statutes of this Commonwealth, or to the provisions of these rules and regulations. He shall visit dairies supplying milk in, and to the inhabitants of the city of ..... (or town of .....), and all places where milk is stored, kept or offered for sale, as often as deemed necessary by this Board, and, he shall report the conditions thereof at the time of such inspection, in writing, to this Board. He shall act as agent and prosecuting officer for the Board of Health in all matters pertaining to milk.

7. All cans, bottles or other vessels of any sort used in the production, storage, sale or distribution of milk in this city shall be cleaned and sterilized with boiling water or steam before they are again used for the same purpose, and all cans, measures or other utensils made of metal shall be kept free from dents and rust, and there shall be proper appliances for washing all utensils used in the production, mixing, storage, sale or distribution of milk, and all such utensils shall be washed, cleaned and sterilized with boiling water or steam regularly after being so used. The filling of bottles with milk intended for sale, excepting at a dairy or creamery, is prohibited.

8. The water used in washing apparatus and utensils must be from a public water supply, or if from any other source, its use must be subject to the approval of the Board of Health.

9. No milk shall be brought into or carried within the city of ..... (or town of .....), for the purposes of sale which has been carried upon any wagon or vehicle which is not clean and free from offensive odors, or upon which swill, refuse, garbage or decaying, unwholesome or filthy matter is carried.

10. No person, by himself or by his servant or agent, or as the servant or agent of any other person, firm or corporation, shall, in the city of ..... (or town of .....), sell, exchange, or deliver or have in his custody or possession with intent to sell, exchange or deliver, any milk, skimmed milk, or cream, which contains more than 500,000 bacteria per cubic centimeter, or any pathogenic micro-organism.

11. Every person engaged in the production, storage, transportation, sale, delivery or distribution of milk for sale in this city shall notify the Board of Health immediately on the occurrence of any case or cases of infectious disease, either in himself or his family, or among his employees, or their immediate associates, or within the building or premises where milk is stored, sold or distributed, and at the same time shall suspend the sale or distribution of milk until authorized to resume the same by the Board of Health. No vessel which has been handled by a person suffering from a disease or which is on the premises of a person in whose family or household infectious disease exists shall be removed to hold or convey milk until it has been thoroughly disinfected and sterilized under the supervision of an agent of the Board of Health.

12. Bottles or other milk containers shall not be left with any family in which there is any contagious disease, but milk may be delivered to such families by pouring into vessels furnished by said families. No bottles or other container, previously left with any family in which a contagious disease occurs, shall be removed therefrom except with the consent of the Board of Health in writing.

13. For the purpose of enabling the Board of Health to carry out and enforce the provisions of these rules and regulations, the Milk Inspector, acting as the authorized agent of, or any other qualified inspector or agent of the Board of Health, or any member of said Board, shall, at all times, have free access to all barns, stables, dairies, creameries, stores, wagons and all other buildings or premises in which cattle are kept, from which any part of the milk supply of the city of ..... (or town of .....) is obtained, or in which milk is received, kept, bottled, canned or offered for sale, for the purpose of making inspection of said premises, cattle, vehicles, cans, vessels, measures and other utensils used in conducting the handling, sale and delivery of milk, and for the purpose of taking for analysis or other tests to determine its quality samples of the milk kept or intended for sale in the city of ..... (or town of .....).

14. Whoever tests milk or cream which is to be offered for sale in any form by tasting shall do so by means of a spoon or piece of wood, paper, cardboard or other article, and such spoon, piece of wood, paper, cardboard or other article shall not again be brought in contact with the milk intended for sale, or be used for testing milk until after being thoroughly washed and sterilized; no person shall permit his hands, fingers, lips or tongue to come in contact with milk intended for sale in any form. All persons engaged in the tasting, mixing or handling of milk for sale in any form shall before engaging in such tasting, mixing or

handling, thoroughly clean his hands and finger nails and keep them clean and dry during such tasting, mixing or handling. No person shall permit his hands while wet to remain or pass over any open vessel containing milk intended for sale in any form. No person shall fill a jar, can or other receptacle with milk while the aforesaid jar, can or other receptacle, is held over an open vessel containing milk intended for sale in any form. No person who has sore throat, diarrhoea, or is suffering from any other disturbance of the bowels, or has symptoms of infectious or contagious disease, shall engage in the handling of milk which is to be offered for sale or which is for sale.

15. No urinal, water closet or privy, shall be located in rooms in which milk is handled, or so situated as to pollute the atmosphere of said rooms.

16. Dealers in milk are prohibited from allowing any person or persons not in their employ to loiter about the milk room or handle any vessel or utensil used in the sale or distribution of milk.

17. Every person, firm or corporation in the city of ..... (or town of .....), engaged in the sale, delivery or distribution of milk from dairies, shall, upon request from the Board, certify that the above rules are complied with by said dairies.

GEO. E. BOLLING, *Chairman.*

The report of the Committee was accepted and ordered printed, the Committee being instructed to watch all milk measures introduced during the present session of the legislature.

Mr. BOLLING. Last year we got through the legislature, and had it made a law, a transfer in the appointment of milk inspectors to Boards of Health; and the Senate foisted upon us an amendment whereby the Boards of Health of towns had no voice in determining the compensation. So we have put in another bill this year, a bill we hope may be made an Act, House Bill No. 512, whereby the Boards of Health of towns are granted the right of fixing the compensation of their milk inspectors. So everyone who represents a town Board of Health should assist in the passage of this bill, which places towns and cities on an equal footing. Some difficulty has occurred in one place, at least. The milk inspector of the town of Westfield had to serve without any compensation whatever, because the selectmen saw no need of inspection. There may have been other instances. That is one we know of.

The Committee on Nominations reported as follows:

For President, Dr. Henry P. Walcott, of Cambridge.
For First Vice President, Dr. S. H. Durgin, of Boston.
For Second Vice President, Dr. C. V. Chapin, of Providence.
For Secretary, James C. Coffey, of Worcester.
For Treasurer, Dr. James B. Field, of Lowell.
For the Executive Committee, for two years: Dr. L. M. Palmer, of South Framingham; Dr. F. G. Wheatley, of North Abington; Dr. John F. Worcester, of Dorchester; Dr. J. J. Goodman, of Clinton; Dr. J. P. Schneider, of Palmer.

PRESIDENT WALCOTT. I am very much disappointed in the report of your Committee. I supposed it was distinctly understood that my term of service was at an end here. I intended it should be. I don't wish to interrupt the harmony of the proceedings, gentlemen, if you have got so far. I wish to have it distinctly understood, however, that I don't intend to block the way here forever, and that this is my last year, positively.

(The Secretary was instructed to cast one ballot each for the nominees, as read.)

Report of Committee on Sex Hygiene.

During the year we have continued to print and distribute Circulars 1 and 2 throughout the state and to an extent exceeding 55,000. We have also issued a circular for women known as No. 3, of which 10,000 have been distributed.

The demand for them is continuous from ministers, school principals and superintendents, physicians, dispensaries, (such as Mass. Gen'l Hosp. O. P. D. and Boston Dispensary), certain public school Parents' Assns., Y. M. C. A.'s, Y. W. C. A.'s, labor unions, and individuals. We have at present requests for several hundred which we are unable to supply because we could not reprint without exceeding the appropriation made by you. The different items of the program adopted two years ago have been advanced as time and opportunity permitted.

We were instrumental in securing and organizing the great public meeting under the auspices of the State Charities Conference and through our initiative its proceedings will be published and distributed free—the funds having been raised by a man who first knew the importance of the subject through one of our circulars distributed at the 1915 Exposition.

We have co-operated with the Mass. Comm. on the Blind, the Boston Bath Dept., and other agencies through whose united efforts the beneficent objects of the committee will ultimately be obtained.

If the work of the committee meets with your approval it respectfully suggests that its report be accepted as progressive and that the usual appropriation of $250.00 be made for its continuance during the year ahead.

Respectfully submitted,

Dr. Louis M. Palmer,
Dr. Gardner T. Swartz,
Dr. H. Lincoln Chase,
Walter E. Kruesi, *Sec.*

It was voted to accept the report and place it on file, and to refer the request for an appropriation to the Executive Committee.

AN IMPROVED BUBBLING DRINKING FOUNTAIN.

By Mr. SIMEON C. KEITH, JR.,
Boston, Mass.

As is well known, the bubble type of drinking fountain has of late been widely adopted by the more progressive cities and towns for use in schools and other public places. This type of fountain displaces the common drinking cup, which, as is well known, is liable to spread disease. In the bubbling fountain the water is discharged upward in a short stream from a nozzle so that a person may drink the water as it emerges therefrom. The continuous flowing type seems to be the one most generally favored for the reason that the water continually washes away any bacteria which may be left by the person last drinking.

In the practical use of such a fountain, however, a difficulty has arisen from the fact that the pressure of water in the service pipe supplying the fountain varies to a very great extent, especially on the upper floors of buildings, on account of the fact that water is delivered to sinks, water closets and wash basins from the same source, the water being largely reduced in pressure each time one of the latter is in use, and consequently the height of the stream or bubble varies from time to time. In a school, for instance, the height of the bubble is regulated by a throttling valve when the toilet rooms are not in use, and hence at recess, when the water closets require a constant flow of water and the fountains are most in demand, the bubble or jet is reduced to its minimum. On the other hand, were the height of the bubble to be adjusted when the other fixtures in the building are being used, the pressure in the fountains at normal periods would be so great that the jet or bubble would rise to too great a height and much water would be wasted; as well as the fact that the high jet is an unsatisfactory one to drink from. The object of the present invention is to provide such drinking fountains with means for regulating the water pressure, so that the height of the bubble or

jet will remain constant at all times, regardless of the varying pressure in the service pipe. To this end I have interposed between the nozzle of the fountain and the service pipe a reducing valve which is operated by the water pressure to vary the opening in a port leading to the nozzle so that the flow of water being delivered to the nozzle will be automatically equalized.

It will be apparent that the invention may be utilized in various standard fountains which are supported by columns or otherwise. The construction of the device is most simple. It consists of a cup or bowl cylindrical in shape and provided with a cap having an opening of a size to produce a jet suitable for fountains of this type. The lower end of the cup is reduced and provided with a threaded portion which may be screwed into the service pipe. Inside the cup is an accurately fitted brass piston carrying a small plunger, the lower end of which fits a hole in the bottom of the cup, leading to the service pipe, so that when the piston is in its upper position in the cup, the water supplied from the service pipe will be entirely cut off. A portion of the plunger, however, is cut away, so as to make it cone shaped; consequently, when the piston is in the lower position in the cup, the plunger is carried down through the opening to a point where there is a large annular opening to the service pipe. The piston with its plunger is normally kept in its lower position by a small brass spiral spring. The piston has an opening through it, and this opening can be varied by means of an adjusting screw so that the water entering into the lower chamber from the service pipe passes through the opening in the piston into the upper chamber, from whence it emerges through the nozzle in the cap to form the drinking jet. When connected with service pipe, the operation is this: Water rushes into the lower chamber, forcing the piston upward against the spring to such a point that the pressure of water against the piston exactly balances the pressure exerted by the spring. In the upward travel of the piston the annular opening to the service pipe is reduced by the attached conical plunger to a point where the flow of water is just sufficient to maintain this balance. If the initial pressure is high the piston is forced upward so that an exceedingly small annular opening is left around the plunger.

As the pressure is reduced in the service pipe, it requires a larger opening for the water to exert the same pressure on the piston. The spring, therefore, forces the piston downward, increasing the annular opening to a point where the flow or water is sufficient to again balance the pressure of the spring, consequently a uniform pressure of water is maintained in the lower chamber.

It must be borne in mind that water is constantly flowing from the lower chamber to the upper and that this flow will be constant as long as the pressure in the lower chamber is constant.

THE IMPORTANCE OF REGISTRATION AND CONTROL OF CASES OF LARYNGEAL AND PULMONARY TUBERCULOSIS.

By DR. DAVID D. BROUGH.

The belief that consumption was a communicable disease was entertained long before there was any scientific demonstration of the fact. In Italy this opinion was held in the eighteenth century. The work of Laennec on diseases of the chest in the early part of the last century, and the discovery of the stethoscope are important epochs in the progress of our knowledge of the disease.

In 1865 Villemin, in France, proved that pulmonary tuberculosis was transmissible from man to animals by inoculation experiments. *Herard & Cornil called attention to the transmission of phthisis by close association. Louis believed that 90% of phthisis was acquired and only 10% of hereditary origin.

In 1875 a medical commission appointed by the Boston Board of Health stated in their report of consumption: †"It is a disease of which the causes are to a considerable extent undeniably subject to control and removable by measures of both public and private hygiene." The report calls attention to its prevalence among certain nationalities, the influence of damp and unsanitary dwellings, privation of fresh air and sunlight, the danger from dark and ill ventilated lodging houses, the evils of intemperance, and the effects of indoor occupations. It calls attention to the lowered death rate in English towns from consumption by improved sanitation, and very pertinently asks why similar results should not be attainable in Boston. None of these preventable causes would be denied even with our advanced knowledge of today. How judiciously the subject was considered is seen in the result in Boston at the present day, 35 years after.

* De La Phthisis Pulmonarie (Paris, 1867).

† The Sanitary Condition of Boston, 1875.

There has been for the last fifty years a steady decline in the number of deaths from consumption relative to the population. This has been marked not only in this State and City, but in many other cities of the United States and Great Britain, and elsewhere. A glance at the Tuberculosis charts for the last fifty years clearly shows this.

Various agencies combined to produce this result long before the active crusade began. Chief among them has been the great improvement in sanitation in cities. Improved sewerage and water supplies, new methods of lighting, heating and ventilation, have had an important influence. The constant work carried on by the Health Departments against damp and unsanitary houses and alleys, and against the dark and airless sleeping rooms, must have had some effect. The regulations against overcrowding, against the smoke nuisance and dust, the inspection of dangerous occupations, the adoption of devices for protection in dirty and dangerous trades, have been movements for protection from tuberculosis, even though they were not adopted for that purpose. The great movements for temperance and better living have been very important factors. It was not until 1882, when Koch discovered that tuberculosis was caused by a living micro-organism, the tubercle Bacillus, that consumption was placed absolutely in the class of communicable diseases. The term communicable seems more suitable to apply to consumption than "infectious." The term "infectious" tends to convey to the mind a disease like smallpox, measles, or scarlet fever, an idea which it is not desired to imply in tuberculosis.

The cause of tuberculosis has been definitely established. Under what circumstances can it be communicated?

Among veterinarians and students of the diseases in animals there is a strong opinion, as seen in the writings of Salmon, Ravenal, Behring, and others, that much of human tuberculosis comes from animals. They give great weight to the ingestion theory that the tubercle bacilli are carried into the system through uncooked meat or milk and then carried through the lymphatic system to the lungs, and that much of the pulmonary tuberculosis is caused in this way.

Most health boards, while not denying that animal tuberculosis may be communicated to man, are inclined to regard this

method as a small factor in the spread of pulmonary and laryngeal tuberculosis. They agree generally with the opinion expressed by Koch in the London Congress of 1901, which opinion is shared by many eminent bacteriologists, and by specialists in the disease, that human tuberculosis comes chiefly from man. In the Report of the Medical Officer of Health of Calcutta (1903), consumption is shown to be prevalent among Hindoos who by their religion are forbidden to eat meat. In Japan there is tuberculosis though raw cow's milk is rarely used by the great mass of the people.

The concensus of opinion among health officials as expressed in their circulars is that consumption is a preventable disease which is caused by the tubercle bacillus, a living organism which enters the body by the medium of the inspired air. Practically all observers agree that human sputum from a tuberculous case is the main cause of tuberculosis. It is not the moist sputum that is dangerous, but only when it dries and is inhaled. Sputum may be dangerous when coughed in small droplets and inspired.

The organisms when exposed to direct sunlight are killed in a short time. Expectoration out of doors in the gutter or street, when not walked on or carried on the clothes or shoes is not of especial danger. The sputum deposited within doors or on handkerchiefs and allowed to dry constitute a real danger. The organisms live in the dried condition for a considerable time, varying with different observers from six weeks to eight or nine months, or even more. The dust from floors and walls of rooms occupied by consumptives has been repeatedly proved to be infected. *Dr. Flick and others attach the greatest importance to house infection.

If rooms are infected by a living organism it is plainly the part of preventive medicine to make them safe for subsequent occupants. It is hardly within the scope of this paper to discuss what methods of disinfection are best. That there is a real reason for disinfection is apparent. In order to accomplish any result there is need to obtain knowledge of the individual case. Notification is thus absolutely necessary. By Notification and Registration of Tuberculosis reference is made only to pulmonary and laryngeal tuberculosis. These include 90% of all cases.

* Flick Maryland Med. Journal, Feb., 1904.

Tuberculosis of the glands, of the bones, of the joints, of the genito-urinary organs, of the kidneys, of the meninges, and of the skin, can hardly be regarded as constituting any real menace.

To require all these forms to be reported would only complicate matters that are intricate enough at present. It would necessitate different methods of action for the different classes. Until more definite knowledge is obtained we should concentrate our activities against a known means of infection and not waste them on uncertain and indefinite possibilities.

Compulsory notification should be applied to laryngeal and pulmonary tuberculosis and to the other forms only when they are associated with these forms of the disease.

Notification means compulsory notification. Voluntary notification has been tried in British cities and has not proven effective.

The idea of reporting cases is not new, though the general application is of recent growth.

In 1782 the Government of Naples required physicians to report every case of consumption which came to their knowledge, with a fine (of 300 ducats) for the first offense and banishment for ten years for the second. There are other regulations drawn up by this Government that read like the orders of the most advanced Health Board of the present day. The authorities were required to tear out and replaster houses occupied by a consumptive, from garret to cellar, the sick poor were to be removed to a hospital, the superintendent of the hospital was required to keep in a separate place the clothing and bedding for the use of consumptives. There are other orders for the disposition of clothing and susceptible household goods.

Notification was recommended by the International Medical Congress at Paris in 1888 and 1893 and in the London Congress of 1901. It is favored by nearly all medical bodies and specialists in the disease. The reasons for reporting cases were carefully stated in a paper by Dr. E. O. Otis before this Association in April, 1908.

In an article written in 1893, *Dr. James B. Russell, of Glasgow, states that he was not aware of any country or place where this had been done."

* Prevention of Tuberculosis.

There has been a great change since then. I have communicated with the health boards of forty of the largest cities of the United States and Great Britain. In the United States, January 1, 1910, thirty-three report that notification of pulmonary and larygneal tuberculosis is required, and in only two is there no requirement. The seven cities in Great Britain have some form of notification, compulsory in some instances, voluntary in others, some a mixed system of voluntary and compulsory, depending on the class of patients.

Registration of pulmonary and laryngeal tuberculosis was required by law in Michigan in September, 1893, and somewhat later in New York State. In most of the cities it has only been adopted during the last seven years and in some within the last year.

In all these cities except four disinfection is required. In one nothing is done and in the other three disinfection is performed on request.

Compulsory notification of pulmonary and laryngeal tuberculosis began in Boston in May, 1900. I have sent inquiries to various cities to find what proportion of the estimated cases in each city has been reported. The replies are to January 1, 1910:

In two cities 90% are estimated reported.
In one city 80% are estimated reported.
In one city 65% are estimated reported.
In three cities 60% are estimated reported.
In two cities 50% are estimated reported.
In one city 38% are estimated reported.

In the remainder (24) the proportion runs from 33% to 5% of the estimated number of cases. In Boston about 70% of the total number of cases are estimated to be reported. The estimate is made on the death returns of pulmonary tuberculosis for 1909. Seventy per cent of the deaths that come to the office are found to have been previously recorded. This is a fair method of estimating.

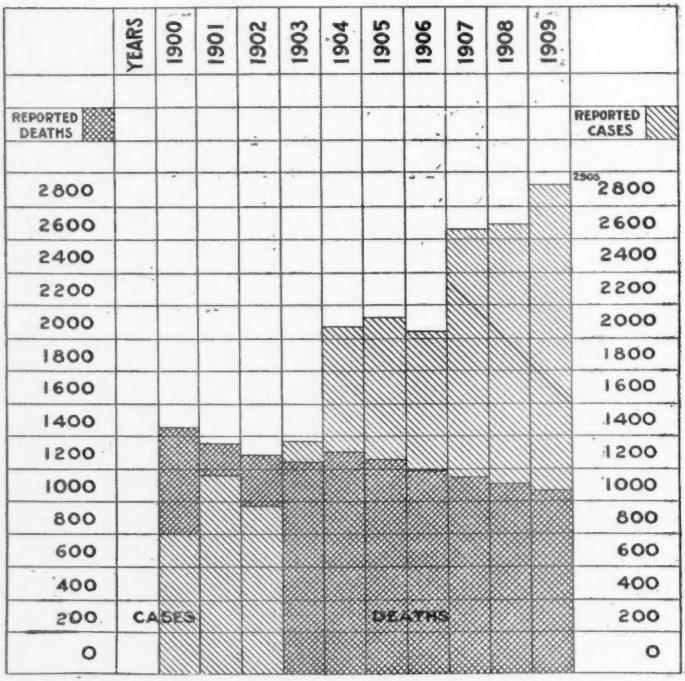
In the cities where the best results have been obtained a vigorous campaign has been carried on to get the cases reported. It is only by strenuous effort that definite results are obtained.

PHTHISIS PULMONALIS—REPORTED CASES, DEATHS, RATES OF DEATHS TO 10,000 INHABITANTS AND POPULATION IN BOSTON.

YEARS	POPULATION	REPORTED CASES	DEATHS	RATES OF DEATHS PER 10,000 INHABITANTS
1900	560,892	815	1,407	25.08
1901	567,617	1,149	1,346	23.71
1902	574,465	944	1,247	21.70
1903	581,359	1.355	1,227	21.10
1904	588,320	2,138	1,280	21.76
1905	595,380	2,168	1,224	20.56
1906	602,526	2,131	1,185	19.67
1907	609,757	2,623	1,123	18.42
1908	617,144	2,646	1,068	17.30
1909	624,574	2,905	1,055	16.89

In previous years commencing with 1846 the average death rates per 10,000 living in five-year periods were as follows: 1846–1850, 44.50; 1851–1855, 47.36; 1856–1860 (four years), 45.08; 1861–1865, 42.27; 1866–1870, 38.13; 1871–1875, 40.34; 1876–1880, 37.45; 1881–1885, 40.91; 1886–1890, 35.44; 1891–1895, 28.88; 1896–1900, 24.05.

PHTHISIS PULMONATIS. CASES AND DEATHS REPORTED.



A favorable sign is this: There has been a steady increase in the number of reported cases in this city for each year. At first the reporting was not taken seriously by the physicians. The reported cases only mean the new cases. The duplicates are not considered. This does not mean that tuberculosis has increased only the reports of the disease.

	CASES REPORTED	DEATHS
1900 (7½ mos.)	815	1407
1901	1149	1346
1902	944	1247
1903	1355	1227
1904	2138	1280
1905	2184	1224
1906	2131	1185
1907	2623	1138
1908	2646	1094
1909	2905	1065

Another very favorable sign is the diminution of unreported cases. The number of unreported deaths has steadily been growing less.

RELATION TO TOTAL CASES REPORTED EACH YEAR			
30% app.	In 1904	out of 1280 deaths	695 never reported
28.6 %	1905	1224	605
18. %	1906	1185	406
18. %	1907	1138	481
16. %	1908	1094	400
11. %	1909	1065	320

This shows that the registration is becoming more complete more complete each year. In 1904 the unreported cases were more than 50% of the total deaths from that year and there has been a steady fall until in 1909 only about 30% of the deaths had never been previously reported.

The relation that the deaths from consumption in any one year bear to the cases reported in that year has greatly improved. That is to say, physicians are reporting cases earlier than was formerly done. A longer time elapses between the report and the death of the case. At first it seemed as if the cases were only reported as short a time before death as would make it possible to comply with the law. The improvement can be seen by the following figures:

	CASES REPORTED	DEATHS REPORTED	OF TOTAL REPORTED FOR YEAR
In 1905	2184	1043 or	47.7 died within 6 mos. after report
1906	2231	1006	45.1 " " " "
1907	2543	985	38.7 " " " "
1908	2645	945	35.8 " " " "
1909	2905	781	26. " " " "

Previous to 1905 the number of cases that died within six months after being reported was very much greater, being more than one-half the total cases reported in each year. There has been in this respect a great improvement, from more than 50% previous to 1905 the number has fallen to 26% in 1909.

The average duration of life of all the known cases after reporting has risen and is now something over two years.

These are some of the favorable results from registration. If, however, the registration alone is considered, health boards will find themselves greatly in error. Unless some of control is carried on a great many names will be carried on the registry having no practical value. A study of the reported (10324) cases for last four years has been made. Farther back than that it was not found necessary to go, as the registration previous to four years has very little worth, all the cases having practically disappeared. Probably similar results would be obtained elsewhere.

(1) About 41% of these recorded cases died and had come to the notice of the department by the death returns.

(2) About 5% were found by inspectors to have died. These would have been carried as still living if no control had been exercised. Many of these had died away from the city, at hospitals or elsewhere. Some had died in the city from some other cause than consumption; when the death certificate was looked up there was no mention of tuberculosis as a contributing cause.

(3) A large number running from 14% to 25% each year or 23½% of the total reported cases for the four years, could not be found at the place designated on the (reporting) card. This was shown by a visit made immediately after the notification. Many of the addresses were plainly fictitious, a vacant lot, a business block, or a number given that was not on the street. In many cases when the address was correct no such person as reported could be found living there.

(4) A few cases under observation moved away in the interval between the visits of the Inspector without leaving their address.

(5) A considerable number, 10% to 12%, went to hospitals or sanitariums. Beyond the fact that they had gone to a hospital or to take treatment somewhere, no further information could be obtained.

Thus, theoretically, while registration may appear simple, it is a complicated matter. From what I have shown some control is necessary and one of the most important is some sort of supervision or inspection.

In Boston all the cases have been kept as far as possible under observation by the Inspectors of our department, and all have been investigated up to the present.

In only eight, including Boston, of the thirty-four cities in this country, was any control exercised over the cases after reporting in 1909. In these there was either partial or complete supervision. In some private cases were not under any control. Two additional cities will begin this year to maintain complete supervision over all cases.

All the British cities have some form of inspection. One reply presents tersely the gist of the question (Edinburgh): "All cases visited except in the few instances on which the medical attendant reports all precautions taken. The cases are subsequently kept under gentle unobtrusive observation, so that any removal may be followed by disinfection."

A health department must have its own means of inspection to carry out any method of control. The law requires notification to be made to health department, and it is the only body that has the means of knowing of all the reported cases.

In many cases the supervision can well be left with the attending physician, providing he will notify the Board of any change of address. There should be no control when the result can be accomplished in other ways.

To get a better registration there are certain lines of improvement.

(1) There is need for physicians to report their cases more carefully, 30% unreported cases is still large. An explanation is required from every physician who sends an unreported death from pulmonary tuberculosis. In the main we are dependent on our reports from: first, physicians; second, dispensaries and hospitals; from the bacteriological examination of the sputum; from charitable organizations, etc., and from death returns.

(2) There is more need of care in furnishing the correct address. A health board can do its part, but needs the co-operation of those afflicted with the disease. They must know their responsibility and the dangers others are exposed to by their not furnishing proper information. The function of a health department is primarily preventive, and only curative as prevention makes cure.

(3) With the increased number of patients admitted to hospitals and sanitoriums, it is necessary for a health department to know about these cases. Every hospital or sanitorium on the

reception of a case of pulmonary or laryngeal tuberculosis should be required by law to send the name and address to the city or town from which the patient came. They should also be required to notify the city or town on the death or discharge of the patient. This would overcome some of the difficulties of registration. Our Board has an order requiring owners and tenants to send notice when a case of tuberculosis moves. If this were more frequently complied with a great benefit would result.

It is impossible to give more than a rough estimate of the number of reportable cases in this city. There are so many that could not be found that there is a liability of considerable error. I have endeavored to find what has happened to all the known cases since 1906. If we assume that the same result has happened to the lost cases in each year as to those that have been traced there would probably be 4200 living cases on the registry. If these represent 70% of the cases as only 30% of the deaths last year had not been previously reported, this would give approximately 6000 reportable pulmonary and laryngeal cases in this city at present.

Some estimate the average life of a consumptive as three years, and find the number of cases by multiplying the deaths in each year by this average. I am inclined to think that our average of life would be somewhat higher. There is not, however, any definite relation yet established between the deaths and the number of cases. To find the actual number of deaths in any city it is necessary to find how many of the reported cases properly belonging to that place, die outside of the city. Further work may give more definite ideas on this subject.

There is an opportunity for smaller cities and towns to do excellent work in registration. With their smaller number and more fixed population, a better registration could be obtained and a very accurate estimate of the total cases in a town arrived at. Every case could be followed from time of registration to the end. The average duration of life of consumptives, the average length of life after reporting, the number that die in each year and some idea of what proportion recover, could be obtained. We would be able to know the curative results of the modern treatment of the disease.

DISCUSSION.

Dr. MINOT. While not very familiar with the subject, I think Dr. Brough has brought out very well many of the points and many of the difficulties that there must be; the actual difficulties of getting these reports. I think that the most important thing would be that which he recommends: a most careful account of the cases, a tracing of the cases from the time they are first known, to understand the situation; where they move to, the chances of infection, the duration of life—whether they get well or die, and how they get well or die. One thing which Dr. Brough alluded to, was the question of registration of deaths. That must vary in many places from what it actually should be, because oftentimes cases reported in Boston, for example, die outside of Boston, which would lead to a wrong impression of the number of cases. In the city of Boston now, a considerable number of cases under the hospital department, are transferred to the Holy Ghost Hospital in Cambridge, and the reports of these deaths appear in the reports of Cambridge and not in those of Boston. There were 124 such deaths in 1909. This leads to a more or less fictitious figure, of course, in regard to the deaths that should really be put down as Boston cases. The same would hold true in regard to cases dying at the State Hospitals for Consumption, or the hospital at Tewksbury or anywhere else outside of Boston. On the other hand some cases come to Boston and die which are not strictly Boston cases. I think Dr. Brough's paper is a very valuable one in showing the difficulty that doctors and boards of health must have in trying to follow and trace these cases. They should be given more credit, I think, than they sometimes receive.

Dr. CHASE, of Brookline. There are two questions I would like to ask of Dr. Brough. One in regard to crediting the deaths from consumption or other diseases where the patient dies away from home. Every year in Brookline we print in our report on vital statistics the number of deaths that occurred in the town and also the number of residents who died away from home, and form our estimate of mortality for the year on that basis. Is that the proper way, I would like to ask, to credit those deaths?

Dr. BROUGH. The only way we can do, of course, is to take the actual number of deaths in the city. In Boston there are many of the hospitals and institutions that receive cases from outside. I endeavored to get figures for the last four years and to look up the relation, but couldn't find out definitely. I should think there might be more deaths in institutions outside of the city that properly belong to Boston than possibly there are that come in, but still, a great many come in. I think that for some of the years I looked up there were as many as one hundred or one hundred and fifty died outside of the city that could not properly be credited to Boston. At the same time, Boston sends out a great many cases to other hospitals, of which we have no record, because the hospitals and institutions outside do not report to us when a case has died, so we have no way of crediting them. The only way we can find out about them is by our inspectors going to the houses. The reply would be that the case went to the hospital and died. We cannot always find out what hospital. Of course, where we can get information, the case is marked as having died. In that manner only could we find the actual death rate.

Dr. CHASE. You don't include the deaths of Boston residents which occurred away from Boston among the Boston deaths?

Dr. BROUGH. We couldn't find them; but that was balanced in Boston to a large extent because we have many hospitals and dispensaries to which people come from out of town.

Dr. CHASE. My other question was this: Dr. Brough stated that all cases of pulmonary and laryngeal phthisis should be reported. Since 1907 not only pulmonary and laryngeal tuberculosis but all forms of the disease are, by the public statutes, required to be reported. Dr. Brough hasn't told us what he thinks of that requirement. Is it wise or unwise to require all forms to be reported?

Dr. BROUGH. You mean, as a matter of practical value. If a case of tuberculosis of the skin is reported, I don't see how you can do anything, or regard it as an infectious disease. Of course, as a matter of registration, knowing how many of these

other forms of tuberculosis there are, it might be valuable, but not as a real practical Board of Health problem. I think the danger of infection is confined to pulmonary and laryngeal tuberculosis. It would be impossible in the other cases to look up and inquire about the isolation, and inquire as to their situation, without great complications. There are no objections to reporting them, but as a matter of practical value for Boards of Health, I suppose they must confine themselves to pulmonary tuberculosis. Probably most of the other forms come through pulmonary and laryngeal tuberculosis. We know that through those forms of the disease millions of tuberculosis organisms can be thrown off from throat and lungs. You know, in bone tuberculosis, the extreme difficulty of finding any organisms; you can work for a long time without finding a single organism. You can do the same in regard to lupus. You can make sections in the skin but it is extremely difficult oftentimes to find any organisms. So, as a preventive form of medicine, I do not think reporting them can be regarded as having any special value, I mean as far as any definite action is concerned, as cases to be looked up and looked after.

Mr. WILSON. I should like to ask Dr. Brough if he has any practical suggestions for securing the registration of cases when they go from the city to institutions and again on their return to the city from the institutions? There are many institutions outside the city which receive patients with tuberculosis, as those at Tewksbury or Bridgewater, or even the Hospitals for the Insane. At the present time patients are admitted to these hospitals and often dismissed to return home without any notification to the Board of Health which should have such patients under supervision. Has the speaker any plan for curing that situation?

Dr. BROUGH. I mentioned that I thought there ought to be some law or regulation passed requiring these institutions or sanitoriums either private or public that receive these cases, to notify Boards of Health of a city or town that a case has been received from that city or town, and the address, and when the case is discharged they should also send a notice to the

city or town to which the case is going, stating the probable address of the case, and in the same way, when a patient dies, a notice should be sent to the city or town from which the case has been received. In that way you would have a more accurate registration than we have at present. I suggested that in the paper.

Dr. SWARTS, of Rhode Island. I would like to state the practice in Rhode Island. The law requires that the institution shall report. In fact, the amount of the fine imposed upon the superintendent of the institution failing to report is ten times greater than that upon a physician who does not report. Before the state law was passed the practice was already in vogue that the sanitorium would report to the Board of Health, to Dr. Chapin, in his city, and now to the State Board of Health, for the whole State, stating where the patients had gone to. But as you may know, it is very little advantage, so far as Dr. Wilson's suggestion is concerned, that fumigation might be brought about, for fumigation down our way doesn't stand in very high favor. It is of value to us to know where the patient goes to. We can advise the local League or District Nurse's Association, and they in turn can follow up the case and keep up the habits which the patient has learned in the sanatorium and which we know are likely to lapse unless the nurse keeps up the stimulation.

Dr. PAQUIN, of Webster. I would say that the plan of notification to the local Board of Health is carried on by the Rutland Sanitorium. The Superintendent or Examiners notify local Boards of Health of every patient examined for admittance who shows signs of tuberculosis and also notify the local Boards of Health after a patient has taken a course of treatment at the sanitorium and is discharged, particularly if the patient has not made a good recovery and needs supervision. But I cannot say as to whether or not local Boards of Health from where the patient originally belonged, are notified after a patient has died at the sanitorium.

OPHTHALMIA NEONATORUM: FACTS CONCERNING THE DISEASE AND ITS PREVENTION AS AFFECTING THE STATE OF MASSACHUSETTS.

By MARK W. RICHARDSON, M. D.,
Secretary of the State Board of Health.

Ophthalmia neonatorum and its important relation to health, happiness and efficiency has always been a subject of supreme human interest.

Due, in a great majority of cases, to a micro-organism which is responsible for one of the greatest venereal scourges of mankind, its history is necessarily coterminous with that of gonorrhoea in general. As with other bacterial diseases, however, great advances could not be made in the study of the prevention and cure of this malady until its causation was definitely determined. The role of gonococcus as the major cause of gonorrhoea was made plain by Neisser in 1879, and in 1881 Credé showed that the systematic use of solutions of nitrate of silver in the eyes of new-born babes would eliminate almost absolutely the occurrence of ophthalmia neonatorum. Important as was this latter discovery, however, the fixing of the responsibility for gonorrhoeal disease upon a definite micro-organism, the gonococcus, stimulated and furthered the study of the conditions in a way possible through the occurrence of no other event. Given the chief cause of the disease, the manner of its spread and a reliable method of prevention, it would seem that the disease, at least as far as the eyes are concerned, has no excuse for existence. This happy result is, I am sorry to say, far from actual achievement, and it is to discuss the reasons for the continuance of ophthalmia neonatorum and its baleful consequences that this paper has been written.

As stated above, Credé discovered the efficiency of nitrate of silver as a prophylactic in 1881, and this important fact has been incorporated into the teaching of text-books and professors ever since. Laws have been passed requiring physicians to report to

local boards of health the occurrence of inflammation in the eyes of the new-born, the law of Massachusetts having been passed in 1905. Medical journals publish masterly articles on the subject and exact information has been sent to each physician of the Commonwealth by the State Board of Health, and yet, up to the present time but little check seems to have been exerted upon the occurrence of the disease.

What do statistics tell us?

According to the official census there were, in New York State, in 1906, 6,200 blind persons. Of this blindness, 32 per cent was due to preventable causes, and 10 per cent. or 620 cases, was due to ophthalmia neonatorum.

Another investigation showed that of the new admissions to ten schools for the blind, 25 per cent was blind because of ophthalmia neonatorum.

According to figures submitted by the Massachusetts Commission for the Blind, there are in Massachusetts about 400 blind persons, of whom 25 per cent became blind before they were four weeks old.

At the Boston Nursery for Blind Babies, in 31 out of 51 cases the blindness was due to ophthalmia neonatorum.

Through the kindness of Miss Kate Brannick of the Social Service Department of the Massachusetts Eye and Ear Infirmary, I am able to quote details concerning 116 cases of ophthalmia neonatorum, this being the full number of cases treated in the Gardiner ward of that institution during the period from October, 1908, to October, 1909.

"The following tables give the more significant statistics:

PLACE OF BIRTH:	
At home	106
In hospital	10
BIRTH ATTENDED:	
By private physician	95
By dispensary physician	16
By city physician	3
By midwife (non-professional, physician later)	2

SENT TO INFIRMARY:

By attending physician	72
By specialist or other physician consulted later on	11
By lying-in hospitals	2
By board of health	5
By other social or charitable institutions	8
By midwife (not attending)	1
By other advice	8

SENT TO INFIRMARY:

From Boston	71
From 27 other Mass. cities and towns	42
FROM other States	3

VISION ON DISCHARGE:

Normal	87
1 eye disabled	6
1 eye blind	16
Blind	6
Question of total blindness	1

Following is the history of the six children made totally blind:

1. Second child of colored parents; born in city adjacent to Boston. The father deserted a few weeks before the child's birth and the mother was compelled to call upon the city physician for confinement. He prescribed for the eyes on three separate visits, but did not advise hospital care. A friend of the mother took the child, when two weeks old, to a member of the Overseers of the Poor, likewise a physician, who sent at once to the Infirmary, but too late. This child died later at the Nursery for Blind Babies.

2. Child of American-French parentage; born in large manufacturing city of New Hampshire. Birth attended by private physician, who gave no treatment for the eyes, but sent to the Infirmary when one week old, too late to save the vision. Living in New Hampshire.

3. Second child of American parents. Comfortable home in same city as Case 1. Birth attended by private physician, who gave treatment for the eyes and suggested the Infirmary, but did not advise. Taken to Infirmary when five weeks old by the mother, who refused to leave it in the hospital until reminded that the matter would have to be referred to the Board of Health. Ulcer, both eyes, when admitted. Died later at home.

4. Third child of Jewish parents in comfortable circumstances in Massachusetts mill town. Birth attended by private physician and untrained nurse. Doctor prescribed medicines for the eyes, which were administered by the nurse. Taken to the Infirmary on this doctor's advice, when 11 days old, too late to save the eyes. Living in Massachusetts.

5. Illegitimate child of Irish-American parentage; born in a Massachusetts city. Birth attended by private physician. Mother gave history of gonorrhoeal discharge, for which the doctor prescribed. Case of so-called secondary infection, when child was about 16 days old, and attending physician was again called. He prescribed and instructed the mother to send for him again if the eye condition did not clear; but told her nothing of the possible serious nature of the trouble. Called in again when child was two months old, when he sent it at once to the city physician, who in turn sent to the Infirmary. Blind when admitted. Living in Blind Babies' Nursery.

6. First child of Lithuanian parents; born in adjacent city; father earning $15 per week; good home. Birth attended by private physician. Mother gave history of gonorrhoeal discharge. Case of secondary infection when child was about ten days old and visits of the doctor had ceased. Taken to the Infirmary by the parents when sixteen days old, too late to save the eyes. Living at home.

The statistics of the nationality of these babies do not bear out the general belief that the disease occurs largely among the non-English-speaking people. Of the 116 babies, 73 were of English-speaking parentage, practically equally divided among American, Irish and British (Provinces). Of the remainder, ten were of French-Canadian parentage, 10 Jewish, 6 Italian, 2 Swedish, 1 each German, Portuguese, Polish, Lithuanian, Greek; 10 were colored.

Nor do the figures confirm the general impression that the disease is found in the homes of the very poorest; 63 of the homes from which these babies came may be described as good; 19 more, as fair.

One of the most significant facts brought out in the study is the very few instances of babies sent to the Infirmary from the various lying-in hospitals, where the cause of infection must so

frequently exist. This can be accounted for only by the use of prophylactics, which has now become general in the lying-in hospitals. If such prophylaxis should become general throughout the State, the resulting familiarity with its use would tend to eliminate the chief objection raised against it; namely, that it may be used not wisely but too well, as it has been put by one critic."

In 1905, the following law was passed by the Massachusetts Legislature:

(Revised Laws, Chapter 75.)

SECTION 49. A householder who knows that a person in his family or house is sick of smallpox, diphtheria, scarlet fever or any other infectious or contagious disease declared by the state board of health to be dangerous to the public health shall forthwith give notice thereof to the board of health of the city or town in which he dwells. Upon the death, recovery or removal of such person, the householder shall disinfect to the satisfaction of the board such rooms of his house and articles therein as, in the opinion of the board, have been exposed to infection or contagion. Should one or both eyes of an infant become inflamed, swollen and red, and show an unnatural discharge at any time within two weeks after its birth, it shall be the duty of the nurse, relative or other attendant having charge of such infant to report in writing within six hours thereafter, to the board of health of a city or town in which the parents of the infant reside, the fact that such inflammation, swelling and redness of the eyes and unnatural discharge exist. On receipt of such report, or of notice of the same symptoms given by a physician as provided by the following section, the board of health shall take such immediate action as it may deem necessary in order that blindness may be prevented. Whoever violates the provisions of this section shall be punished by a fine of not more than one hundred dollars.

SECTION 50. If a physician knows that a person whom he is called to visit is infected with smallpox, diphtheria, scarlet fever or any other disease declared by the state board of health to be dangerous to the public health, or if one or both eyes of an infant whom or whose mother he is called to visit become inflamed, swollen and red, and show an unnatural discharge within two weeks after the birth of such infant, he shall immediately give notice thereof in writing over his own signature to the selectmen or board of health of the town; and if he refuses or neglects to give such notice, he shall forfeit not less than fifty nor more than two hundred dollars for each offence.

Moreover, in May, 1909, ophthalmia neonatorum was made reportable to the State Board of Health in accordance with Sections 49 and 50 of Chapter 75 of the Revised Laws. The

effect of these official actions can be studied best, perhaps, in a table kindly furnished by Dr. S. H. Durgin, Chairman of the Boston Board of Health.

REPORTED CASES OF OPHTHALMIA NEONATORUM IN BOSTON.

YEAR	CASES REPORTED	TREATED IN HOSPITAL	BROUGHT FROM OTHER CITIES
1905 (from Sept. 5)....	16	3	..
1906	34	13	1
1907	17	7	..
1908	39	31	2
1909	171	115	30

All cases of ophthalmia neonatorum reported and not already under treatment in hospital are seen by a medical inspector, and if proper care cannot be secured in the home the case is sent to the hospital.

It will be seen that the percentage of reported cases which go to the hospital has laregly increased, as has also the number which come from outside the city.

The records of the State Board of Health show no cases reported in 1905, 1906 or 1907; 20 cases in 1908 and 100 cases in 1909. There can be no doubt that the large increase in reported cases in 1909 was due to the action of the State Board of Health in putting the disease on the notifiable list, in sending to each practitioner a communication calling his attention to the law and in giving him detailed information concerning treatment. It is, of course, too early to estimate the effect upon the aggregate blindness of the State.

The best statistics agree that at large maternity hospitals, the routine use of antiseptics prevents in large measure ophthalmia neonatorum. In a series of 2265 births before the use or prophylactis 10% developed ophthalmia. In 1160 births with prophylactics 0.17% had ophthalmia. This being the case, why does not the attending physician in private practice, following the advice of Credé, instill into the eyes of new-born infants a solution of nitrate of silver of proper strength? It is, in part, undoubtedly, because it is one more thing to attend to at what is apt to be a very busy time. More, important, undoubtedly,

is the fact that the disease is, after all, so rare in the private practice even of eye specialists that the possibility of its occurrence is not considered by the physician until it falls suddenly to his lot. Long immunity leads him to minimize the danger. Then, too, he may fear that if the real reason for the instillation be known, uncomfortable doubts and suspicions may be raised in the mind of either of the parents or of both. Having the case of ophthalmia neonatorum in one of his patients, why does not the physician report the case promptly to the local board of health as required by law? Here again the physician is apt to minimize the importance of the condition and to believe the situation is one simply of slight irritation and that it will clear up speedily. Too late does he lealize the condition and then irremediable damage has been done. Here again it is very probable that the physician is deterred from reporting a case of ophthalmia neonatorum because of the possible unpleasant notoriety which might fall upon the parents. He fears the spreading broadcast of the information that a certain baby is suffering from a disease having in all probability a well known venereal origin.

That such a fear is not entirely ill-founded is shown by certain tendencies in modern newspaper practice. In a certain city of this State, it is the custom to publish, periodically, notices of the decease of the city's inhabitants, together with the causes of death. I am credibly informed that this practice has produced in the custom of the physicians a distinct change, so that causes of death which might bring unpleasant notoriety upon the family of the dead person are incompletely or even falsely reported.

If such sensational newspapers should carry this practice still further and report in the public prints the causes of disease in those who are unfortunate enough to be sick, it is easy to see that physicians might cease to report even the small number of cases of ophthalmia neonatorum which now reach the health offices.

There can be no other opinion, I think, than that this newspaper practice is most reprehensible. It is done, of course, to cater to the morbid curiosity of the masses. It cannot fail to have a very marked deleterious effect upon the value of our vital statistics, to say nothing of the shame and grief which it must from time to time bring upon the innocent relatives of the dead.

Why have not more physicians been brought into court and prosecuted under the law requiring notification? As far as I can learn the main reason for lack of prosecutions has lain in the difficulty of securing the co-operation of those individuals most conversant with the facts. As before stated, parents, physicians, and hospital authorities also display the greatest hesitancy in publishing to the world the details of cases of ophthalmia neonatorum.

It has been suggested that a civil suit for damages instituted by the parents of a child who had lost its eyesight through ophthalmia neonatorum might be the most efficient method of awakening the medical profession to its responsibilities. Such a plan would seem certainly to have some merit.

In an effort to counteract this evil some States—Indiana, Minnesota, New York and Ohio—have placed upon their birth certificates, questions as to whether a prophylactic has been used at the birth. I have not been able to learn whether this change in the birth certificates has brought about any amelioration in conditions. Two States, furthermore, (New York and Rhode Island), have undertaken to furnish to practicing physicians prophylactic outfits in the shape of small vials of nitrate of silver solution (1 per cent), together with appropriate droppers. Here, too, I cannot learn as to the ultimate effects of this procedure. The State Board of Health of Massachusetts has this latter question under consideration. With free distribution to physicians of prophylactus there would certainly be no excuse for failure to use them.

In a discussion of ophthalmia neonatorum, the relative responsibility of midwives for the occurrence of the disease is distinctly pertinent. I cannot find, however, that midwives are more at fault than the regular practitioner. The midwife has no legal status. She practises a branch of medicine without a license, yet, curiously enough, through an oversight in codifying the laws, she is officially recognized on the birth certificate in use in this Commonwealth. There can be no doubt that she should either be brought under proper supervision or she should be suppressed. In Fall River, in 1908, according to a preliminary report by the research department of the School for Social Workers, 829 births were reported by midwives and 2,297 by physicians.

CONCLUSIONS.

1. The cause of ophthalmia neonatorum and the manner of its spread are known.

2. Reliable methods of preventing the disease are known.

3. The law in Massachusetts is such that the disease, if promptly reported, may still be deprived of many of its destructive effects through energetic co-operation of local and state health authorities.

4. Improvement in conditions is, undoubtedly, going on, but it is slow. Rapid change for the better can be obtained only through a sharp appeal to the self-interest of the practitioner. There can be little doubt that vigorous enforcement of the law concerning notification, with or without resulting convictions, would, through the publicity alone, impress the importance of this matter upon the profession to an extent possible in no other way.

5. The practice of midwives in Massachusetts is extensive and without supervision. They should be regulated or suppressed.

DISCUSSION.

Dr. SWARTS, of Rhode Island. It is hardly necessary to appeal to practical health officers here as to the pathetic side of this question—as to whether an infant, being brought into the world without its own volition, shall be subjected to blindness, whether it will or no. The question before us is whether or not we have here a communicable disease, a preventable communicable disease. Assuming we have, in view of the paper we have heard and the general literature published, the question is why we should not undertake some means of prevention. As has been stated in the paper, the question is why the physicians do not report their cases. In the first place, I think if they had the cases they would not care to report them, from fear of censure on the part of the family. Second, in many instances, the cases occur after the physician has been dismissed from the case. As I understand the general practice of the accoucheur, it is to attend cases and give three free visits for the fee imposed upon the family—excuse the word "impose." That being the case, the physician not being there, perhaps, for more than three or four days after the birth of the child, he is not aware of the fact that the disease has occurred. I have run across cases in Rhode Island where the disease has occurred from the ignorance of the parents, because the physician has not warned them to be on the watch for symptoms of the trouble.

Then the question arises, is there any advantage in prophylaxis? As has been suggested by the writer, by the use of the Credé method, preferably one rather than two per cent of the nitrate of silver solution, as causing less inflammatory conjunctivitis, one may be able to prevent the disease. It is, however, a difficult matter to get the general practitioner to use anything in the baby's eyes at each birth. If anything happens, and he was discovered putting drops in, why, he was the cause of the trouble. But the experience of practitioners who have practised in lying-in hospitals, where they use a preventive, and where they have the worst kind of cases, is that very few cases develop when the children are born there. If that is the case, it is practicable, probably, to prevent the disease; or we should look for it in those institutions. But in general practice I have

learned from physicians who have had experience that way, that they were able to put these drops into the eyes of the baby on the ground of cleansing the eyes without explaining that they are nitrate of silver. And that brings in the point—we cannot use what we would like to—the other two silver solutions, argyrol and protargol, for the reason that they produce a mahogany stain. After putting a few drops of that mahogany colored stain into the eye, there wouldn't be any question on the part of the family that the doctor produced the disease. He isn't going to get into trouble that way. But it seems possible we can educate the physician to a sense of his duty in using nitrate of silver; and surely, in any case, we can educate him to a sense of his duty to warn the parents as to what is likely to occur, especially if there is any liability to the disease. And especially it seems to me it is the duty of Boards of Health to educate the people that this disease exists, and is liable to occur, and to be on the alert for it. Of course, there are different ways of educating the people. Some believe in telling the people, and some believe in hoping that they will hear of it in some way. That is a practical question for the Sex Hygiene Committee to work out. And of course, one question involves the other.

We have in Rhode Island endeavored to educate the physicians to a realization that there is such a thing as a prophylactic and such a thing as a disease called ophthalmia neonatorum by distributing among them outfits containing nitrate of silver and circulars of information on the subject. They also carry with them a little suggestion to the doctor that nitrate of silver alone first dropped in is not sufficient but he must go on with his treatment, following up the case, if he proposes to save the eyes. It isn't a question of today, but of tomorrow. Where we sent out our outfits at the first of the year last year, we are sending them out at the beginning of this year. We place them in the stations where diphtheria and other outfits can be obtained, and there can be no excuse that the physician has got to go seven miles before he can get hold of the solution; it is in his bag along with his other paraphernalia for the proper treatment of the case, and he can keep stocked up without expense. It seems to me a favorable thing for the Boards of Health to educate the physicians in this way and to assist them in having prophylactics

handy. We sent out last year one thousand of these cases and intend to this year. From Dr. Porter, of the New York State Board of Health I understand that they have sent out twenty-five thousand in that state. The number of cases reported was only twenty-four cases in 1908, and forty cases in 1909.

As to finding out practical results, I doubt if we shall ever see the actual results of this treatment, because we don't know in how many cases the disease occurred after the use of it, or in how many cases the doctor did not use it, and the disease did occur. But if the labor and expense serve to save one pair of eyes only in each State it will be a good investment.

Dr. PALMER, of Framingham. There is one practical feature that appeals to me. I think it is true that physicians as a rule, know enough, if they would do what they know, to take these precautions. The midwife, the average midwife, I think it is safe to say does not know enough to take these precautionary measures. Now, it seems to me this Association could do a thing of practical value here today if they would request the present legislature through its Committee on Public Health to take some action for an oversight of the midwives of Massachusetts. To bring it before the Association, I move you to that effect. (Motion adopted.)

(Adjourned.)

PERSONAL HYGIENE.

By PERCY G. STILES, Ph. D.
Assistant Professor of Physiology in Simmons College.

PHYSIOLOGY AND RATIONAL HYGIENE. Popular ignorance of the working of the human body is impressively extensive. Misconceptions of its physiology abound. Sometimes these are encountered in the form of vague statements which the user cannot elucidate but which nevertheless appear to satisfy him. Hence the free reference to "humors" and "bad blood." Sometimes more definite notions come to the front, as in the prevailing tendency to hold the liver responsible for every sort of minor ill. "Torpid liver" is a favorite euphemism for constipation. The evils of autointoxication are constantly charged upon the organ which is our chief defense against the mischief in question. And as to the bile, who has not heard people allude to this secretion as to a poison which ought not to be formed in the body? The convalescent from sea-sickness will almost always say, with a reminiscent shudder: "I think it must have done me good; I got rid of a good deal of bile." In the field of physiological mechanics we meet the curious notion that the lungs make the chest enlarge instead of the chest the lungs.

Some of these odd views may be held without practical detriment as may the opinion that the earth is flat. But in other instances erroneous conceptions of the body may have serious results. For a fantastic physiology may lead to a fantastic hygiene. The man whose ideas of his physical system are unsound is the man who may be led widely astray by the strange doctrines of self-constituted teachers of health cults. He may readily fall a victim to quacks when he is sick. An elementary knowledge of physiology is a valuable asset to the voyager whose course is to be held steadily between the Scylla of patent medicines and the Charybdis of Christian Science.

We have come to a time when the medical profession needs defenders. Much is written and spoken against its supposed conservatism of spirit and inadequacy of method. Its detractors charge upon it errors and excesses that were long ago abandoned.

Surgeons are carelessly charged with performing needless operations for mercenary ends. Many people point to the diminishing use of drugs and recklessly conclude that all medicines are without value. The uncritical observer of the cures wrought in Christian Science circles and in classes in psychotherapy fails to appreciate that many forms of disorder lie outside the sphere of such ministrations. This is in spite of earnest efforts on the part of leading workers in the field of mental healing to disclaim anything like a universal range of service among the sick. Certain periodicals—"Life" being conspicuous among them—having begun with an agitation against experiments on animals, have gradually come to ridicule the medical profession and belittle its services.

It is not necessary to know a great deal of physiology to be safeguarded against such errors of judgment. But how few people of average intelligence have a stock of information upon this subject at all comparable with their knowledge of geography! The map of Africa presents to them a more familiar outline than does the diagram of the human stomach. This ignorance has several causes. An important one is the unfortunate treatment of the subject in the public schools. Physiology, or rather anatomy, is taught to young children who cannot visualize the structures which they painfully memorize and who cannot comprehend their workings. The subject rarely has a place in High School programs where it might be useful. A science which could not be evolved historically until chemistry and physics had provided a foundation for it is forced upon pupils several years in advance of these fundamental studies. It is not strange that adults of the present generation recall physiology, if at all, as a vaguely unpleasant memory of grewsome charts and many-syllabled names. About the impression there will probably linger an alcoholic aroma.

The teaching of physiology in grammar schools must always be unsatisfactory and should perhaps be largely replaced by instruction in hygiene. In high schools physiology ought to have an important place. But for some time to come it will be difficult to have it well taught. There are few branches in which it is more essential that the teacher shall have a large reserve of detailed knowledge. Without much reading of the best books

and a broad training in chemistry, including that of organic compounds, no teacher can safely undertake to answer the questions of an eighteen-year-old class. If he indulges in speculations he will almost certainly become responsible for serious misconceptions.

In all instruction in physiology given to pupils of any maturity, the emphasis should be mechanistic. Much false hygiene springs from the failure to recognize the sway of the laws of chemistry and physics over the animal body. To deny the operation of such laws is to open the way for the dangerous view that right use and care of one's self are not supremely important. An organism exempt from the limitations of all mechanisms might escape the obligations of hygienic living and the penalties of its violation. In the opinion of the writer the greatest achievement of nineteenth century physiology was the demonstration that the principle of the conservation of energy applies rigidly to living things.

The mechanistic approach does not lead to the neglect of mental factors in hygiene though this might be predicted by some critics. If we regard the nervous system as a mechanism it remains as true as ever that the processes in it which accompany optimistic thinking go far toward securing the right working of the various organs. The significance of habit is the more clear when its physical basis is understood.

There would be less reason for this plea in favor of more general intelligence in regard to the human body if there were not so much written about health in the magazines and elsewhere. Much of the dogmatic hygiene thrust upon the general reader is wholesome and helpful. Some of it is quite otherwise. The advice given is very questionable when there is an advertising motive—the introduction of a new breakfast-food, a beverage, or a tonic. Even in the hygiene columns which are genuine editorial productions there is likely to be a great deal of individual experience which is rashly assumed to apply to all men. A moderate familiarity with physiological principles makes it possible for one to read such paragraphs with discrimination, saying of one suggestion, "That is reasonable," of another, "That would not apply to everyone," and of a third, "That can hardly be sound."

VETERINARY HYGIENE.

By W. L. BEEBE, D. V. M.,
Bacteriologist for the Minnesota Live Stock Sanitary Board.

JOHNE'S DISEASE. The subject of Johne's Disease has in the past few years received much attention in veterinary journals and also received much at the International Veterinary Congress at the Hague last year. There is a very marked difference of opinion as to the origin of the bacterial cause. Some are of the opinion that it is a variation of the tubercle bacillus of Koch, while others think that it is the avian tubercle bacillus and some think that it is a saprophytic form of the bovine tubercle bacillus. A very forcible argument against the theory of the attenuated bovine bacillus is that in Jersey where tuberculosis is unknown, this disease is widespread.

From the sanitarian standpoint this question is of very little importance as in all probability it would not be of material aid in controlling the disease. The most important thing to be borne in mind is that the bacilli are contained in the feces and that to eradicate the disease from the herd all cases should be disposed of as soon as possible. An animal will many times make a partial recovery and later have a recurrence of the disease and die. It is very probable that in these cases the bacilli were present in the intestinal mucosa and were being discharged in the feces constantly.

It should be the duty of the veterinary officials to locate all infected herds and adopt means to prevent of the disposal of infected animals for breeding purposes. The chronic nature of the disease makes it particularly hard to deal with and for this reason it would be wise to give more attention to the disease or in certain locations it may become as prevalent as bovine tuberculosis.

BOVINE TUBERCULOSIS, CONTROL. Several States have adopted the method of paying a reimbursement for condemned tuberculous animals. This work has been going on in a few instances for a long enough length of time to reap results,

particularly where several hundred thousand dollars have been paid out. Dr. Reynolds at the International Congress last year pointed out that it would require $35,000,000 to eradicate tuberculosis in Minnesota, if the present methods were followed. At this rate what would it cost to stamp out the disease in the United States? This is by far the most wide spread disease and the most disastrous to the cattle raising industry that we have to deal with. It should therefore receive more careful consideration. When a large indemnity is paid to the farmer and he proceeds to replenish his herd with untested cattle or neglects to make second test for several years it would appear that the states are being defrauded? Yet such is the case and how can it be avoided? When the pioneers were starting out with this work, it was necessary for them to pay the farmers an indemnity in order to get them to have their cattle tested. Now the prevalence of this disease has been pointed out and if an indemnity is to be paid the farmer should be made to replace the condemned animals with cattle that have passed the tuberculin test. In Jan., 1910, a law went into effect in Minnesota requiring that all pure bred cattle should pass the tuberculin test before being sold. This is a very important step forward for records show that a large percentage of tuberculosis in the grade stock comes from pure bred cattle. In Wisconsin a law recently went into effect requiring all cattle that were sold, either pure breds or grades, should be tested with tuberculin. In Minnesota, testing by laymen is now allowed as is the case in Wisconsin, so it would be impossible to enforce such a law as in certain sections of the states there are no veterinarians and the price to get a qualified man would make it prohibitive.

The control of this disease is in the hands of very able men in most instances, and they are to be commended for their work, but are the farmers doing their share in preventing the spread of this disease?

It has been shown that the pasteurization of skim milk prevents almost wholly the spread of tuberculosis among calves. If this method was adopted and the reacting animals isolated and their products pasteurized it would be of less expense to the state and also to the farmer. This would not be applicable in all cases

as people object to drinking pasteurized milk. Also, it is worthless unless the farmer takes interest enough in the matter to see that his milk is properly pasteurized and that his isolation is complete. This method has proven satisfactory in several European countries and why not try it more in this country?

MUNICIPAL SANITATION.

By CHARLES V. CHAPIN, M. D.,
Superintendent of Health, Providence, R. I.

FLIES AND DISEASE. The last report of the Commission on Typhoid Fever in the District of Columbia (Hygienic Laboratory Bulletin, 52, p. 30) briefly discusses the relation of flies to typhoid fever. A chart is presented showing the seasonal distribution of flies and typhoid fever cases in Washington during the summer of 1908. According to this diagram the maximum number of flies were found towards the last of June and after that time they decreased quite rapidly. The maximum number of typhoid fever cases occurred about a month later, and during the next two months decreased only slightly. The Commission concludes that "The parallelism between the two curves certainly is not sufficiently striking to warrant the conclusion that flies play much of a role in the transmission of typhoid fever in Washington." They suggest, however, that the flies may be somewhat of a factor in the spread of the disease, and perhaps at times may be of importance in small local outbreaks.

During the years 1907 and 1908, in London, (Reports of the Medical Officer of Health to the London County Council), Hamer made a series of very valuable observations in regard to the distribution of flies. This work is worthy of the careful perusal by all who are interested in this subject, and the accuracy with which it is done, and the caution shown in drawing conclusions from it stand out in sharp contrast to most of the fly literature published by American health officials. Hamer studies the distribution of different species of flies in point of time, and also their local distribution. Quite a number of centres, such as stables, dumping grounds, and places where offensive trades are carried on, were selected, and the distribution of flies around these was carefully noted. It was shown that there was a marked difference in the number of flies near such places and a few hundred yards distant. Last summer similar, though less extended observations were made on the local distribution of flies in Providence. Surprising differences were noted in regard to the number of flies found in the clean and filthy sections of

the city. Where yards were untidy and in the vicinity of cheap markets, and around dirty tenements flies were several hundred times as numerous as in the best residential sections. In London, Hamer gave careful attention to the relation of flies to summer diarrhea. Although there was some correspondence between the fly curve and the diarrhea curve, it was not in either year close enough to indicate any causative relation between the two. As Hamer well says, even if the two curves should correspond exactly, it would not, as so many seem to assume, demonstrate the dependence of diarrhea upon flies. There was some evidence that diarrhea was no more prevalent around stables than elsewhere, though flies were vastly more numerous. In 1908 there were many less flies than in 1907, but very much more diarrhea. In 1907, during the continuance of excessive fly prevalence, diarrhea was steadily increasing, while during a similar period of fly excess in 1908, diarrhea was decreasing. Hamer thinks that both flies and diarrhea are more likely to be dependent upon some cause or group of causes, than that diarrhea is dependent upon flies.

ISOLATION IN HOSPITALS. In the last number of the JOURNAL a reference was made to the success attained by Dr. Gordon at Manchester in the treatment of other diseases in open scarlet fever wards, by insisting upon strict medical asepsis, and for moral effect inclosing the patient in a barrier of wet screens. Dr. Miles B. Arnold, Gordon's successor, writes me that he has now abandoned the screen of damp sheets, because with them it is impossible to see the patient and to oversee the nurse. It is also depressing to the patient to be thus surrounded, and the evaporation from the damp sheet is not desirable. Dr. Arnold fences off the case with a tape, which is just as effectual a barrier to the imaginary flight of germs as are wet sheets or solid walls.

REGISTRATION OF CASES OF DIARRHEA. During the summer months of the years 1905–1908 the notification of diarrhea was compulsory in Woolwich, London. During this period 844 cases were notified, of which 115 died, which gives a case fatality of 13.5 percent. This is almost precisely the fatality noted in Huddersfield. (Report of the Medical Officer of Health of the County to the London County Council, 1908, p. 45.)

TYPHOID FEVER FROM A SWIMMING TANK. Reece (Report of the Medical Officer of the Local Government Board, [Eng.] 1908–9, p. 90.) reports an outbreak of typhoid fever occurring among naval recruits stationed at Walmer. There were in all 33 cases, and according to Reece there hardly seemed to be any chance for contact infection, at least among the earlier group. Water, milk and other foods seem to have been certainly excluded. It was found that all the earlier cases frequently made use of the swimming tank, which was shown to be polluted with typhoid infected sewage. Reece believed that the outbreak had its origin in this infected tank, though perhaps was continued to some extent by contact infection.

TUBERCLE BACILLI IN MILK. Delepine, at Manchester, England, has for many years made a careful study of the infection of the milk supply of that city with tubercle bacilli. A very full account of his work is given in a special report included in the report of the Medical Officer of the Local Government Board, 1908–1909, p. 341. From a careful examination of the herds from which tuberculous milk was derived, Delepine concludes that the bacilli almost certainly come from diseased udders in about 78 percent of the samples, and probably from that source in about 16 percent. He believes that by means of bacteriological examination of the milk, and inspection of the udders, but by neither procedure alone, the danger of milk becoming infected with tubercle bacilli can be very largely eliminated.

COLD STORAGE OF VACCINE VIRUS. Blaxall and Fremlin, (Report of Medical Officer Local Government Board, 1908–9, p. 455), have made a series of experiments in regard to the preservation of vaccine lymph in cold storage. They find that it can be kept below a freezing temperature for two years with practically no deterioration. Of 8,559 persons vaccinated with such lymph, 97.8 percent presented evidence of successful vaccination.

SANITARY ENGINEERING NOTES.

By ROBERT SPURR WESTON,
Assoc. M. Am. Soc. C. E.

PURIFICATION OF DRINKING WATER FROM MANGANESE BY ALUMINUM-SILICATE, H. Noll, Gesundbreitsingen. 31, 533–9. An account of experiments on a small scale for the removal of Mn from water by passage through a layer of aluminum silicate where the Al of the silicate displaces the Mn which then combines with the silicate and can afterward be removed by washing with strong KCl solution, regenerating the silicate for further use. The author concludes that the best commercial silicate obtainable, "Permutit," while removing the Mn satisfactorily increases the hardness through solution of lime by CO_2 in the water. Cheaper grades contain $CaCO_3$ which also adds to the hardness. The action varies so that experiments are necessary to determine its adaptability and method of use for each water. When the Mn is present as carbonate it gradually oxidizes and cannot then be removed. This trouble is obviated by excluding air during treatment. The cost of the chemical is about $15.50 per million gals. treated.

INTERPRETATION OF CHEMICAL WATER ANALYSIS, H. Klut (Trans. E. A. Gieseler) Eng. Rec. 60, 498–500. A review of the subject giving the significance of each of the different constituents determined, for sanitary and for industrial use.

SANITARY CONTROL OF FILTER PLANTS, F. D. West, Proc. Eng. Club of Phil. 26, 135–47. This paper gives a brief description of the operation of sand filters and a few important features of their construction with tables showing their efficiency in purifying the water supply of Philadelphia. The Torresdale Filter Plant began to deliver filtered water to the Frankford district, which had previously been using unfiltered Delaware water and had the highest typhoid rate in the city, in July, 1907. A marked improvement appeared at once. The

output was increased until Feb., 1909, when the whole city was receiving filtered water. The typhoid death rate was 25 per 100,000 in 1909, against 72.6 in 1906, 59.7 in 1907, and 35.0 in 1908. These filters keep the bacterial count below 100 per cc. and algae are reduced 99%. B. coli are seldom present and the water is clear. These filters also, by making possible the use of the softer Delaware River water instead of Schuykill water should save $280,000 per annum in cost of soap alone and should decrease boiler incrustation one-half.

WATER SOFTENING OR PURIFICATION AND ITS SAVING, M. Miller, Chem. Eng. 10, 117–21, (Oct., '09). A brief resumé of methods for boiler water softening with a discussion of the cost and saving involved. The best results are obtained from softening plants and particularly from the automatic machine type. The installation of such a plant costs from $5.00 per H. P. for plants of less than 1000 H. P., to $1.20 per H. P. for those of 15,000 H. P. The depreciation is less than 5%. The cost of chemicals varies with the water. Those whose hardness is due only to carbonates of lime and magnesia are least expensive as they require only lime water, costing 0.2c per 1000 gals. to remove 10 gr. per gal. of the former constituent, and 0.48c per 1000 gals. to remove the same amount of the latter. Sulphates and other soluble compounds of lime and magnesia require soda ash. 10 grs. per gal. of $CaSO_4$ costs for removal 1.20c per 1000 gals. and $MgSO_4$ costs 1.36c per 1000 gal. The expense of attendance is very small as the work seldom takes more than a part of an untrained man's time. The fuel saving is estimated at about 16% on an average. Boiler life is increased with waters containing over 10 grs. per gal. of scale forming constituents, 100% and with waters containing 20 grs., 200%. Boiler depreciation is probably reduced 75%.

UNDERGROUND WATER IN CRYSTALLINE ROCKS, F. G. Clapp. Eng. Rec. 60, 525–7. Crystalline rocks are classed, granite, gneiss, schist and diabase, of which the last is the hardest to drill. Water is present in these rocks in their joints, and hence the success of a driven well is dependent upon the chance of hitting one or more of such water-bearing crevices.

The flow is generally moderate, but of very good quality, soft and not high in iron. From the record of such wells up to the present time in New England it is concluded that 90% give sufficient water to supply a family. The probability of reaching this water under 100 ft. is about 85%, but driving beyond 200 ft. is not advisable. It is better in case of failure to start another well 100 ft. or more away than to drive deeper in the first place. The cost of drilling varies from $2.00 to $6.00 per foot and is in general less than that of blasting.

HOUSE APPARATUS FOR OZONIZING WATER, Neisser, M. Chem. Zent. 79, 2, 267–8 (1908–2). A description of a small ozonizer to attach to a house tap and connect with the lamp circuit. No details or costs given.

MINERAL CONTENT OF ILLINOIS WATERS, E. Bartow, J. A. Udden, S. W. Parr, G. T. Palmer, University of Ill. Bull. 6, 3, (Water Sur. Series, 4). A report of 547 analyses made during the years 1895 to 1905 to determine the composition of the mineral residue from waters sent in by parties interested in their commercial or medicinal value. 269 cities and towns and 90 out of the 102 counties of the state are represented. The report is given under the heads:

Distribution.
Geological Classification.
Classification of waters according to chemical and physical characteristics.
Methods and interpretations of analysis.
Boiler Waters.
Medicinal waters.
Analyses—Table.

(H. R. HOSMER.)

BIOLOGICAL LABORATORY NOTES.

By FREDERIC P. GORHAM,

Associate Professor of Biology, Brown University, and Bacteriologist, Providence Health Department.

THE ISOLATION OF THE TYPHOID BACILLUS. Many laboratories have reported excellent results in separating typhoid and colon bacilli by the use of Endo's medium. Endo has described the method of preparing and using this medium in Centbl. f. Bakt. Orig. 35, 1903–4, 109. Klinger gives practically the same directions in Arb. a. d. Kais. Gesundheitsamt. 24, 1906, 52. Kastle and Elvove of the Division of Chemistry, Hygienic Laboratory, U. S. Public Health and Marine Hospital Service, Washington, D. C., report* certain difficulties which they have found in obtaining perfectly reliable and satisfactory results with this medium. They found that impure lactose and impure sodium sulphite seemed to be primarily responsible for the failures. The first can be overcome by using Kahlbaum's c. p. lactose, and the second by using pure anhydrous sodium sulphite in half the quantity originally employed by Endo. They give a method for the preparation of the medium which they claim gives excellent results. They also give an improved method for the preparation of pure anhydrous sodium sulphite.

Jackson and Melia also report† a modification of the well known Hiss method‡ which they claim has many advantages. *B. typhosus* may be found, they claim, even when present in small numbers. The method is applicable to water, milk, and feces. The method consists of a preliminary cultivation of the material to be tested in lactose bile as an enrichment medium and plating from this on Hesse agar to get the characteristic typhoid colonies. The lactose bile medium has been described by Jackson in Biological Studies by the Pupils of William Thompson Sedgwick, 1906; Jour. Inf. Diseases, 1907, Sup. No. 3, p. 30, also Amer. Pub. Health Assoc. Papers and Reports, 32, Pt. 2, 1907,

* Jour. Inf. Diseases, 6, 1909, 619.
† Jour. Inf. Diseases, 6, 1909, 194.
‡ Jour. Med. Research, 8, 1902, 148.

30; Jour. Pub. Hygiene, 18, 1908, 16, also Amer. Pub. Health Assoc. Papers and Reports, 33, Pt. 2, 1908, 101, and Hesse agar has been described in Zeit. f. Hygiene, 58, 1908, 441 and Centbl. f. Bakt. Orig. 46, 1908, 89, but Jackson and Melia give some modifications of the original Hesse method.

ESCULIN MEDIUM. Harrison and Van der Leck have reported* excellent results in the isolation of the colon bacillus by the use of a medium containing the glucoside esculin and iron citrate in which the colon bacillus produces a black colony which is easily identified. At the Boston meeting of the Society of American Bacteriologists, Mr. H. W. Lyall, of Brown University, read a paper in which he questioned whether the esculin medium had any advantages over the ordinary litmus lactose agar. He reported that several kinds of bacteria ordinarily found in water gave the same reaction as the colon bacillus and that their colonies could not be distinguished from the colon colonies. Klotz and Rankin come to this same conclusion.† They tested many strains of intestinal bacteria from man and found that even some strains of colon did not give the esculin reaction. Out of 62 different strains of 13 types of intestinal bacteria only 22 gave a positive reaction while 40 were negative.

* Centbl. f. Bakt. II, 22, 1909, 547, and Proc. Roy. Soc. Canada, 1908, S. III, 2, 105, and Centbl. f. Bakt. Orig. 51, 1909, 607.

† Jour. Inf. Diseases, 7, 1910, 67.

PUBLIC HEALTH LEGISLATION, NEWS AND NOTES.

By FRANCIS H. SLACK, M. D.,
Director, Boston Board of Health Bacteriological Laboratory.

TUBERCULOSIS TEST IN COURT AGAIN. Attention was called in the last issue of the JOURNAL to the Referees' decision in the action brought against the city of Milwaukee and Health Officer Bading to restrain them from enforcing the city ordinance which required that all cattle supplying milk to the city should be tuberculin tested.

Minneapolis and Commissioner of Health Hall of that city, have been passing through a similar experience. On April 15th, 1908, the Minneapolis city council passed an ordinance regulating the sale of milk in that city, which, among other things, provides as follows:

SECTION XIII. "Any adulterated milk, and any milk which has been drawn from cows which have not been inspected by duly licensed veterinary surgeons and tested by physical examination and the tuberculin test for the purpose of detecting the presence or absence of tuberculosis, and any milk drawn from cows where the owner or owners of such cows shall not have filed in the office of the commissioner of health, a certificate of the veterinary of the department of health of the city of Minneapolis, or of a duly licensed veterinary surgeon stating that such cows have by him been inspected as provided by Section X hereof; which has been brought into the city of Minneapolis, or is held and offered for sale in said city, may be seized and destroyed by an inspector or other officer of the department of health of said city authorized to inspect the same."

On the 18th of May, '08, the plaintiffs, consisting of six milk companies of the city, sought a temporary writ of injunction against the city and Health Commissioner, which writ was denied by the court.

The memorandum accompanying this denial sets forth in a convincing manner the charter rights of the city acting through its council to adopt such an ordinance and the authority of health officials to enforce it.

Jan. 26 and 27, 1909, the case came before the court for trial, without jury and being continued was argued and submitted to the court for its decision April 24, 1909. The decision was as follows: "As Conclusions of Law the court finds that the plaintiffs or any of them are not entitled to an injunction or any relief whatever in this action and that the defendants are entitled to have judgment for the dismissal of said action and for their costs and disbursements."

MEMORANDUM.

"The contentions of the plaintiffs upon the trial of this cause were substantially the same as those considered in the court's memorandum attached to the order on file which denied their motion for a temporary injunction except so far as they now assert that compulsory pasteurization is an inexpensive and certain protection against harmful bacteria in milk and cream and should be substituted for the methods prescribed in the existing ordinance complained of. It is, indeed, conceded that pasteurization adequately effected destroys the disease germs. But it is claimed on the part of the defendants that as a practical remedy it is ineffectual, both because the process itself as heretofore conducted is imperfect, and because to secure certainty as to results it would be necessary for the municipality to pasteurize all milk and cream consumed within the city, or to supervise the work by a large number of highly paid inspectors, each method, as it is claimed, involving undue expense and being in large degree experimental.

It is not the province of this court to decide between these respective claims of the parties. As was stated in the previous memorandum, when referring to the tuberculin test, "It was within the legitimate power of the city council, acting under legislative authority, to determine, as it has, that the test is a protection to public health," and is its province, also, to say that such test is a better protection to the community than would be the method proposed by these plaintiffs.

NATIONAL CONFERENCE ON HOOKWORM DISEASE.* —The First National Conference for the Study of the Hookworm Disease, held last week in Atlanta, Ga., was attended by three members of the Rockefeller Commission and by over two hundred physicians, life insurance officials, educators and commercial and industrial representatives. The principal address was by Dr. Charles W. Stiles, of the United States Public Health and Marine Hospital Service, who reported from personal examination of 128 mills in the Southern States that 25% of the mill employees are infected with the hookworm. Other speakers before the conference were Dr. Wyckliff Rose, of Nashville, Tenn., and Mr. E. E. Rittenhouse, President of the Provident Savings Life Assurance Society of New York.

HOOKWORM CAMPAIGN IN THE PHILIPPINES. The report of the Philippine Bureau of Health for the quarter of a year ending September 30th, 1909, states that at that time practically all of the residents of Las Pinas in the Province of Rizal, and from nearby villages numbering in all over 6,000 people, had been examined for hookworms. Of this number 24.2% of the males and 8.06% of the females were found to be infected, or an average of 16.13 per cent of the population.

About 90% of the entire population were found to be infected with some form of intestinal worms and frequently with two or more kinds. It is believed that in towns where conditions are approximately the same as in Las Pinas practically the entire population is afflicted with intestinal parasites of some kind. That this condition has an important influence in lowering the vitality of the masses can scarcely be doubted.

NEW LABORATORY FOR FLORIDA STATE BOARD OF HEALTH.† The State Board of Health is to erect a laboratory in Jacksonville, on property donated by the city at Raspberry Park. The proposed building will cost about $15,000, and will contain accommodation for experiments and investigation, incubator rooms, refrigerator rooms, offices, library and records. The laboratory is to be in charge of Dr. Henry Hanson, formerly of Milwaukee, Wis.

* Boston Medical and Surgical Journal, Jan. 27, 1910.
† Journal American Medical Association, Jan. 22, 1910.

REAPPOINTMENT OF ERNST J. LEDERLE, PH. D., AS HEALTH COMMISSIONER OF NEW YORK CITY. On Jan. 10th last, Dr. Ernst J. Lederle was appointed, by Mayor Gaynor, Health Commissioner of New York City, in the place of Dr. Thomas Darlington. This is the second time Dr. Lederle has held this important position, having been Commissioner for two years under Mayor Low, 1902–3. The salary of the Commissioner is $7,500 and he is also the President of the Board of Health, the Board otherwise consisting of the Police Commissioner and the Health Officer of the Port (Dr. A. H. Doty). In order to accept this appointment Dr. Lederle resigns from his membership in the State Water Supply Commission, salary $5,000, and also from his position as Sanitary Expert of the Board of Water Supply of New York City, salary $10,000. As Sanitary Expert of this latter Board he had supervision of the labor camps on the Catskill Dam and Aqueduct, where work is now being carried on to increase the water supply of the city. These camps averaged a population of 15,000 persons during last year and their sanitary supervision required a regular health department organization and the utmost care in the disposal of sewerage and garbage, control of infectious diseases, etc.

Dr. Lederle brings to his new position a wide experience which should be of great benefit in his administration of New York City health affairs.